THE MEDITERRANEAN PILOT VOL. I.

FIFTH EDITION.

1913.

CAUTION WHEN APPROACHING BRITISH PORTS.

(To be inserted inside cover of all Sailing Directions.)

PART I.—CLOSING OF PORTS.

(1) My Lords Commissioners of the Admiralty having taken into consideration the fact that it may be necessary to forbid all entrance to certain ports of the Empire, this is to give Notice that on approaching the shores of the United Kingdom, or any port of the British Empire, a sharp lookout should be kept for the signals described in the following paragraph, and for the vessels mentioned in paragraph (4), Part II., of this Notice, and the distinguishing and other signals made by them. In the event of such signals being displayed, the port should be approached with great caution, as it may be apprehended that obstructions may exist.

(2) If entrance to a port is prohibited, three *red* vertical lights by night, or three *red* vertical balls by day, will be exhibited in some conspicuous position in or near to its approach, which signals will also be shown by the vessels indicated in paragraph (4), Part II., of this Notice.

If these signals are displayed, vessels must either proceed to the position marked "Examination Anchorage" on the Admiralty Charts and anchor there, or keep the sea.

PART II.—EXAMINATION SERVICE.

(3) Under certain circumstances, it may become necessary to take special measures to examine vessels desiring to enter the ports or localities at home or abroad, referred to in Notices to Mariners No. 1 of 1916 and subsequent years.

(4) In such case, vessels carrying the distinguishing flags or lights mentioned in paragraph (6) will be charged with the duty of examining ships which desire to enter the ports and of allotting positions in which they shall anchor. If Government vessels, or vessels belonging to the local port authority, are found patrolling in the offing, merchant vessels are advised to communicate with such vessels with a view to obtaining information as to the course on which they should approach the Examination Anchorage. Such communication will not be necessary in cases where the pilot on board has already received this information from the local authorities.

(5) As the institution of the Examination Service at any port will never be publicly advertised, especial care should be taken in approaching the ports, by day or night, to keep a sharp lookout for any vessel carrying the flags or lights mentioned in paragraph (6), and to be ready to "bring to" at once when hailed by her or warned by the firing of a gun or sound rocket.

In entering by night serious delay and risk will be avoided if four efficient all round lamps, two *red* and two *white*, are kept available for use.

(6) By day the distinguishing flags of the Examination Steamer will be a special flag (white and red horizontal surrounded by a blue border) and a blue ensign.

Also, three *red* vertical balls if the port is closed.

By night the steamer will carry: (*a*) Three *red* vertical lights if the port is closed; (*b*) three *white* vertical lights if the port is open.

The above lights will be carried in addition to the ordinary navigation lights, and will show an unbroken light around the horizon.

(7) Masters are warned that, when approaching a British port where the Examination Service is in force, they must have the distinguishing signal of their vessel ready to hoist immediately the Examination Steamer makes the signal.

(8) Masters are warned that, before attempting to enter any of these ports when the Examination Service is in force, they must in their own interests strictly obey all instructions as to entry given to them by the Examination Steamer. In the absence of any instructions from the Examination Steamer they must proceed to the position marked "Examination Anchorage" on the Admiralty Charts, and anchor there, or keep the sea

Whilst at anchor in the Examination Anchorage, Masters are warned that they must not lower any boats (except to avoid accident), communicate with the shore, work cables, move the ship, or permit anyone to leave the ship, without permission from the Examination Steamer.

(9) In case of fog, Masters of vessels are enjoined to use the utmost care, and the Examination Anchorage itself should be approached with caution.

(10) Merchant vessels when approaching British ports are specially cautioned against making use of private signals of any description, either by day or night, the use of them will render a vessel liable to be fired on.

(11) The pilots attached to the ports will be acquainted with the regulations to be followed.

NOTATIONS OF SUPPLEMENTS AND ANNUAL SUMMARIES OF NOTICES TO MARINERS RELATING TO THIS BOOK.

To be filled in by Navigating Officer.

[In Chart Depôts the two first columns are alone to be filled up.]

Title.	Date of Publication and Number.	Whether pasted in or noted in Margins of Book, and Date of each Correction.

NOTICE.

HYDROGRAPHIC DEPARTMENT, ADMIRALTY.

In January of each year the information affecting this book, which has been published during the preceding year in the Admiralty Notices to Mariners, is compiled and issued as a separate publication. If a Supplement has been issued during the year, this publication will only include Notices issued since the date of the Supplement. Mariners are advised to procure copies of these publications. They can be obtained gratuitously from the Admiralty Agent or Sub-Agents for the sale of charts on presentation of the coupons on the next page, either personally or by letter. In the latter case the cost of postage must be enclosed.

The Supplements to this book which may be published can also be obtained in a similar manner on presentation of the coupons below.

H. E. P.-C.

Revised Supplement (2) to MEDITERRANEAN PILOT, VOL. I., 1913.	Revised Supplement to MEDITERRANEAN PILOT, VOL. I., 1913.	Supplement to MEDITERRANEAN PILOT, VOL. I., 1913.

(4739). Wt. 45349/420 (120). 4,000.—2/17. T.G.E.

THE

MEDITERRANEAN PILOT,

VOL. I.

COMPRISING

GIBRALTAR STRAIT, COAST OF SPAIN, AFRICAN COAST FROM CAPE SPARTEL TO GULF OF GABES,

TOGETHER WITH

THE BALEARIC ISLES, SARDINIA, SICILY, AND THE MALTESE ISLANDS.

FIFTH EDITION.

ALL BEARINGS ARE TRUE.

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

LONDON:
PRINTED FOR THE HYDROGRAPHIC OFFICE, ADMIRALTY,
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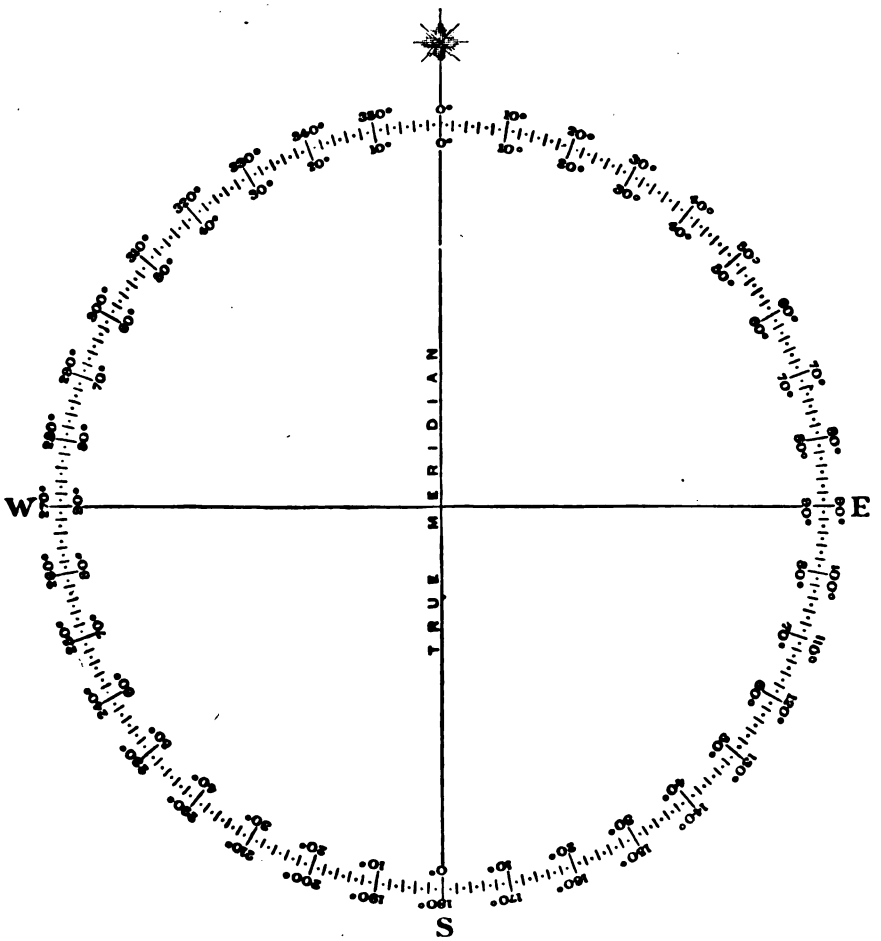
J. D. POTTER, AGENT FOR THE SALE OF ADMIRALTY CHARTS,
145, MINORIES, E.C.

1913.

Price Four Shillings.

TRUE BEARINGS.

Diagram to facilitate the conversion of True Bearings expressed in degrees of the circle from 0° to 360° into True Bearings expressed in degrees of the quadrant from 0° to 90°.



ADVERTISEMENT TO THE FIFTH EDITION.

THE Mediterranean Pilot consists of four volumes. Vol. I. includes the descriptions of the south and south-east coasts of Spain, from Cape Trafalgar eastward; the Strait of Gibraltar, and the Balearic islands; the north coast of Marocco, the coast of Algeria and of Tunis; also descriptions of the coasts of the islands of Sardinia, Sicily, and Malta.

Vol. II. gives descriptions of the coast of France, the west and south coasts of Italy, and the island of Corsica; the coasts of Tripoli and Egypt; the coast of Syria, and of Karamania; and also the island of Cyprus.

Vol. III. gives sailing directions for the Adriatic, the Ionian islands, and the western coast of Greece as far as Cape Matapan.

Vol. IV. gives a description of, and directions for, the Grecian archipelago, with the adjacent coasts of Greece and Turkey, including the islands of Crete, Scarpanto, and Rhodes.

The Dardanelles, Sea of Marmara and Bosporus, and Black sea are described in the Black sea Pilot.

All bearings are true, and in degrees measured from 0° (North) to 360°, reckoned clockwise.

Vol. I. of the Mediterranean Pilot was originally compiled from the early Spanish surveys of Don V. Tofiño; the French surveys of MM. Bérard, 1832, and Mouchez, 1867-73; from those of Rear-Admiral W. H. Smyth, 1815-24; and of Captains Copeland, Graves, Brock, Spratt, Mansell, Shortland, Nares, and Wilkinson, of the Royal Navy, 1824-72.

The first edition was published in the year 1873, and a second in 1885.

A third edition was prepared by Captain J. C. Richards, R.N., of the Hydrographic Department, in 1894, and the fourth edition by Staff-Commander J. R. H. MacFarlane, R.N., in 1904.

The present edition, prepared by Commander W. O. Lyne, R.N., has been revised from the latest issues of Sailing Directions for the various coasts, and also contains all the latest information received at the Hydrographic Department of the Admiralty.

(4739) Wt. 45349/420 (120). 4,000.—2/17. T.G.E. a 2

Mariners and others are invited, in the interests of navigation, to forward to the Hydrographer, Admiralty, London, S.W., any information that may come under their notice, which would be useful for the correction of the Charts and other Hydrographic Publications issued by the British Admiralty; early advice as to newly discovered dangers, the establishment of, or changes in, any aids to navigation is specially requested.

Copies of a form (H. 102) on which to render information can be obtained gratis from the Admiralty Chart Agent—

Mr. J. D. Potter,
145, Minories, London, E.C.,

or of any of his Sub-Agents in Great Britain and abroad.

By the publication of this work, the fourth edition of Mediterranean Pilot, Vol. I., Revised Supplement, 1911, and all Notices to Mariners relating to that work, up to and inclusive of No. 1,350 of 1913, are cancelled.

H. E. P.-C.

Hydrographic Department,
Admiralty, London,
16th September, 1913.

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CONTENTS.

PLATES OF VIEWS.

GLOSSARIES OF WORDS OCCASIONALLY FOUND ON THE CHARTS AND IN THE SAILING DIRECTIONS.

FRENCH.

French.	*English.*
Aiguille	Needle.
Aimanté, e	Magnetic.
Anse	Bay, creek.
Atterrissage	Making the land.
Avant port	Outer port.
Azur	Blue.
Babord	Port.
Baie	Bay, gulf.
Balisage	Beaconage.
Balise	Beacon.
Banc	Bank, sandbank.
Barre	Bar.
Basse	Shoal.
Basse mer	Low water.
Bassin	Basin, dock.
Bassin à flot	Wet basin or dock.
Bassin d'échouage	Tidal basin where vessels ground.
Bateau de sauvetage.	Lifeboat.
Blanc, he	White.
Bleu, e	Blue.
Bouche	Mouth of a river.
Bouée	Buoy.
Bouée à cloche	Bell-buoy.
Bouée à sifflet	Whistle-buoy.
Bouée lumineuse	Light-buoy.
Boussole	Compass.
Brouillard	Fog, mist.
Brume	Fog.
Caboteur	Coaster.
Cale de radoub	Patent slip.
Cap	Cape, headland.
Chapelle	Chapel.
Charbon	Coal.
Chasse	A rapid discharge of water from a reservoir in order to clear out a channel.
Château	Castle.
Chaussée	Bank, causeway.
Chemin de fer	Railway.
Cheminée	Chimney.
Chenal	Channel.
Clocher	Steeple.
Colline	Hill.
Compas	Compass.
Coquilles	Shells.
Côte	Coast.

French.	*English.*
Courant	Current, stream; a name given to streams flowing into the sea between Arcachon and Cap Breton.
Courant de flot	Flood tidal stream.
Courant de jusant	Ebb tidal stream.
Crique	Creek.
Crue	Freshet or flood.
Declinaison magnetique.	Magnetic declination or variation.
Douane	Custom house.
Échelle	Scale.
Échelle de marée	Tide gauge.
Écluse	Lock of a canal or basin.
Écueil	Rock, breaker.
Église	Church.
Encablure	Cable's length.
Entrée	Entrance, mouth of a river.
Escarpé, e	Bluff.
Étale	(Of tide) slack; (of wind) settled.
Étang	Lake.
Étarqué	Hoisted (as a sail, flag, or time ball).
Étiage	Low-water mark of a river.
Étier	A creek which can receive small vessels; a conduit by which salt water enters a lake to be transformed into salt.
Falaise	Cliff.
Fanal	Harbour lighthouse
Feu	Light.
Feu permanent	A light constantly burning and unwatched.
Fin, e	Fine.
Flèche	Spire.
Fleuve	River, stream.
Flot	Flood.

French.	*English.*
Foc	Jib (sail).
Fond	Bottom.
Forme de radoub	Dry dock.
Fosse	Ditch, a deep.
Gare	Station.
Golfe	Gulf.
Goulet	Narrow entrance.
Grand, e	Great.
Gravier	Gravel.
Gril de carenage	Gridiron.
Gros	Coarse.
Haut-fond	A shoal.
Haute mer	High water.
Houle	Swell.
Île	Island, isle.
Îlot	Islet.
Jaune	Yellow.
Jusant	Ebb.
Lac	Lake.
Madrague	Tunny net.
Marais	Swamp, marsh.
Marée	Tide.
Marée descendante	Falling tide.
Marée montante	Rising tide.
Mât	Mast.
Menhir	A large raised stone, the erection of which may be traced to antiquity. (From the Celtic, maen, stone; hir, high).
Môle	Mole, pier.
Molle	Soft.
Mont	Mountain.
Mortes eaux	Neap tides.
Mouillage	Anchorage.
Moulin	Mill.
Mur	Wall.
Musoir	Mole or pierhead.
Niveau	Level.
Nœud	Knot.
Noir, e	Black.
Occidental, e	Western.
Onde	Wave.
Oriental, e	Eastern.
Passe	Channel.
Patente de santé	Bill of health.
Pertuis	Opening or strait.
Petit, e	Small.
Phare	Lighthouse.
Pic	Peak.
Pierre	Stone.
Pignon	Gable.
Pilote	Pilot.
Pin	Pine or fir tree.
Plage	Shore, beach.
Plateau	Table land, or flat below water.
Pleine mer	High water.
Pointe	Point.
Pont	Bridge, deck.
Port	Port, harbour.
Presqu'île	Peninsula.
Quai	Quay, wharf.
Rade	Road, roadstead.
Rafale	Squall.
Raz (*Bas Breton*)	A name given to a violent tidal stream in a narrow passage.
Rivière	River.
Roche	Rock.
Rocher	Rock.
Rouge	Red.
Sable	Sand.
Salines	Salt-water lagoon, salt works.
Seuil	Sill (as of a dock).
Temps	Time, weather.
Tour	Tower.
Tourelle	Small tower, turret.
Tribord	Starboard.
Usine	Factory.
Vase	Mud.
Vent	Wind.
Vergue	Yard.
Vert	Green.
Vieux, vieil, vieille	Old, ancient.
Village	Village.
Ville	Town.
Vives eaux	Spring tides.

SPANISH

Spanish.	*English.*
Abrigo	Shelter.
Aduana	Custom house.
Aguas muertas	Neap tides.
Aguas vivas	Spring tides.
Aguja	Needle.
Albufera	Tidal lake.
Aldea	Small village; a hamlet.
Alfaque	Sand bank.
Almadraba	Tunny fishery.
Alto	Height.
Amarillo	Yellow.
Arena	Sand.

Spanish.	*English.*
Arrabal	Suburb.
Arrecife	Reef.
Arroyo	Rivulet.
Astillero	Dockyard.
Atalaya	An elevated place from which a considerable view may be obtained.
Babor	Port.
Bahia	Bay.
Bajamar	Low water.
Bajo	Shoal.
Banco	Bank.
Barra	Bar at the mouth of a river or harbour.
Barrio	Suburb; district of a town.
Blanco	White.
Bote salvavidas	Lifeboat.
Boya	Buoy.
Brujula	Compass.
Bruma	Fog; haze.
Cabezo	Summit of a hill.
Cabo	Cape or headland.
Cala	Creek or small bay.
Caleta	Cove.
Camino de hierro	Railway.
Campanario	Steeple; belfry.
Canal	Channel or strait.
Capilla	Chapel.
Carabineros	A post of military coastguards.
Carbon de piedra	Coal.
Carta de sanidad	Bill of health.
Casa	House.
Cascajo	Gravel.
Caserio	Series of houses.
Caseta	Small house.
Castillo	Castle.
Cerrazon	Dark, cloudy weather.
Cerro	Hill.
Chica	Small.
Concha	A shell.
Contrastes	Winds blowing from opposite directions.
Cubierta	Deck.
Cueva	Cave.
Darsena	Dock or basin.
Dique	Dock, dike.
Dique seco	Dry dock.
Ensenada	Bay or creek.
Ermita	Hermitage.
Escollo	Rock.
Espigon	A kind of wharf or pier.
Estero	Small creek.
Estrecho	Strait.
Estribor	Starboard.
Fanal	Lighthouse.
Fango	Mud.
Faro	Lighthouse.
Ferro carril	Railway.
Fondeadero	Anchorage.
Fraile	Friar.
Freo or freu	Strait.
Fuente	Fountain; spring of water.
Fuerte	Fort.
Garita	Look-out house.
Golfo	Gulf or bay.
Grande	Great.
Gris	Grey.
Gráo	Strand, shore.
Iglesia	Church.
Isla	Island.
Isleta	Islet.
Laja	Flat rock.
Lago, Laguna	Lake.
Limo	Mud.
Lugar	Village or small town.
Luz	Light.
Malecon	Dike.
Marea	Tide.
Marea creciente	Flood tide.
Marea menguante	Ebb tide.
Meridional	Southern.
Mesa	Table land.
Molino	Mill.
Montaña, Monte	Mountain.
Muelle	Mole or jetty.
Negro	Black.
Niebla	Fog.
Norte	North.
Ola, onda	Wave.
Oriente	East.
Pardo	Grey.
Peña	Rock or large stone.
Peñon	Rock or rocky mountain.
Pequeña	Small.
Picacho	Summit.
Pico	Peak.
Piedra	Rock.
Piloto	Pilot.
Piloto practico	A harbour pilot (practico is often used alone).
Playa	Beach.
Pleamar	High water.
Poniente	West.
Pueblo	Town; a village.
Puente	Bridge.
Puerto	Port.
Punta	Point.

Spanish.	*English.*
Quinta	Country house.
Recalada	Making the land.
Restinga	Reef.
Ria	The mouth of a river.
Ribera	The shore; the bank of a river.
Rio	River.
Roca	Rock.
Rojo	Red.
Saco	Bay.
Salina	Saltpan.
Sanidad	Health.
Seno	Gulf or bay.
Septentrional	Northern.
Sierra	Mountain ridge.
Sud, Sur	South.
Temporal	Storm.
Terral	Land wind.
Tiempo	Weather.
Torre	Tower.
Variacion	Variation.
Vela	Sail.
Vendaval	South-westerly wind.
Venta	A poor inn.
Verde	Green.
Viejo	Old.
Viento	Wind.
Vigia	A look-out; doubtful shoals.
Villa	Town.
Virazon	Sea breeze.

ITALIAN.

Italian.	*English.*
Acqua	Water; a river with some important tributaries.
Acquitrino	Swamp.
Albero	Tree, mast.
Allerta	Look-out.
Alto, a	High, lofty.
Alzata	Embankment.
Ancoraggio	Anchorage.
Ansa	Creek.
Approdo	Landing place.
Arena	Sand.
Argilla	Clay.
Bacino	Basin.
Baia, Baja	Bay.
Balza	Rock.
Banco	Sandbank.
Barra	Bar.
Battello	Small boat.
Bianco	White.
Boa	Buoy.
Bócca or Bocche	The mouth or entrance channel to a river, bay, or harbour.
Boye	A buoy.
Braccio di O piedi	Fathom.
Burrasca	Squall.
Cala, Calanca	Creek or small bay.
Campanile	Belfry, tower.
Canal	A passage or channel.
Capo	Cape or headland.
Carbon fossile	Coal.
Caricatori	A loading or shipping place.
Casino	Country house.
Castel, Castello	Castle.
Chiesa	Church.
Cima	Summit.
Citta	City.
Colle	Hill.
Corpo di Guardia	Guard house.
Corto, a	Short.
Dársena	A wet dock or basin.
Dogána	Custom house.
Érto	Steep.
Fanale	Light.
Fanno	Mud.
Fáro	Lighthouse.
Faro	Strait.
Ferro	Iron.
Ferrovia	Railway.
Fisso	Fixed.
Fiumára	River.
Fiume	River.
Fiumicino	Rivulet.
Folgori	Flashing.
Fondo	Deep bottom.
Forte	Fort.
Fortezza	Fortress.
Gavitello	Buoy.
Ghiaccio	Ice.
Ghiaja	Gravel.
Girante	Revolving.
Golfo	Gulf, or large bay.
Grádo	A step or landing place.
Grande	Great.
Guado	Ford.
Imboccatura	Mouth of a river.
Isola	Island.
Isoletto	Islet.
Istmo	Isthmus.
Lago	Lake.
Lazaretto	Quarantine quarters.
Levante	East.
Lume	Light.

Italian.	*English.*
Marea	Tide.
Marina	Seashore, strand, a marine esplanade or landing place.
Meda	Beacon.
Molino, Mulino	Mill.
Monte	Mountain.
Moro	Headland.
Muro	A wall; a house.
Nero	Black.
Norte	North.
Nuovo	New.
Nuraghe, *Sardinian*	Ancient round tower or dwelling.
Palude	Marsh, bog.
Passo	Channel.
Penisola	Peninsula.
Piano	Flat, level, low.
Pianura	Plain.
Piazza	Square, market.
Piccolo	Little.
Pietra	Stone.
Pioggia	Rain.
Plana and Piana	A plain, seashore, a beach.
Ponente	West.
Ponte	Bridge.
Pórta	An entrance gate.
Pórto	Port or harbour.
Posta della lettere	Post office.
Punta	Point, peak.
Rada	Roadstead.
Riva	Shore, coast.
Rocca	Rock.
Rosso	Red.
Sabia	Sand.
Salina	Salt-water lagoons, salterns, saltpans.
Sanita	Health office.
Sasso	Stone.
Scala	Landing place or stairs.
Scogli	Rock awash.
Scogliera	Reef of rocks.
Scóglio	Rock above water.
Secca	Sandbank, shallows.
Selva	Forest.
Seno	Creek or small bay.
Stagno	Salt lake.
Strada	Road.
Stretto	Strait.
Testa	Head of a rock.
Tonnara	Tunny fishery.
Torrénte	Water course, rushing stream.
Tórre	Tower.
Valle	Valley.
Vecchia	Old.
Vento	Wind.
Verde	Green.
Via	Road.

ARABIC.

Arabic.	*English.*
Ab, Abu, Bû	Father, chief.
Abiad	White.
Abyar	Wells.
Adel, Aleb	Sloping hill.
Ahmar	Red.
Ain	Fountain.
Akaba, Acol	Wilderness.
Akhal	Black.
Anak	Cliff.
Arish	A dune.
Asfal	Lower.
Bab	Strait.
Bahr	River.
Baida	Desert.
Beni	A son of; a tribe of Bedouins or other Arabs; mountain spurs or ridges.
Bheira	Lake.
Biar, Bir	Wells, well.
Bogaz	An entrance channel.
Buy, Burj	Fort, tower, or castle.
Duar	An Arab encampment.
El	The.
Fasht	Reef.
Gera	Lake.
Halat	Sandbank which dries.
Hamar	Red.
Hassar	A rock.
Jam, Jamia	Mosque.
Jebel, Jibel, Gibel	Mountain or hill.
Jezirat	Island.
Kad	A shoal.
Kalat	Castle.
Kantara	Bridge.
Kasba	Citadel.
Kebir	Large.
Kef	A rocky point.
Khor	Creek.
Kudiat	A small hill.
Ma, Moye	Water.
Maghreb	West

Arabic.	*English.*
Márabút	Monument or tomb.
Marsa, Mers, Mersa, Marza.	Bay, cove, harbour, or port.
Masjed	Mosque.
Matla	East.
Muzik	Strait.
Nahr	River.
Rais or Reis	Captain of a vessel.
Rais el Marsa	Captain of the port.
Ras	Cape or point.
Rif	Coast.
Seghir	Little.
Shab	A rocky shoal.
Shark	East.
Sherm	Cove.
Sidi, Sedi	Applied as Márabút to the tombs of saints or devout men.
Tarf	Cape.
Wády, Wadi	Valley or ravine; the bed of a river usually dry except during the rainy season; also occasionally applied to rivers.
Wed or Uad	A wadi; a river.
Welled	A tribe of Arabs.
Zeitun	Olives.

POINTS OF THE COMPASS OF THE CHIEF MARITIME COUNTRIES IN THE WESTERN BASIN OF THE MEDITERRANEAN.

English.	Spanish.	French.	Italian.	German, by Austria.
North.	**Norte.**	**Nord.**	**Tramontana.**	**Norden.**
N. by E.	N. c. N.E.	N. q. N.E.	T. q. G.	N. z. O.
N.N.E.	N.N.E.	N.N.E.	G.T.	N.N.O.
N.E. by N.	N.E. c. N.	N.E. q. N.	G. q. T.	N.O. z. N.
N.E.	N.E.	N.E.	Greco.	N.O.
N.E. by E.	N.E. c. E.	N.E. q. E.	G. q. L.	N.O. z. O.
E.N.E.	E.N.E.	E.N.E.	G.L.	O.N.O.
E. by N.	E. c. N.E.	E. q. N.E.	L. q. G.	O. z. N.
East.	**Este.**	**Est.**	**Levante.**	**Osten.**
E. by S.	E. c. S.E.	E. q. S.E.	L. q. S.	O. z. S.
E.S.E.	E.S.E.	E.S.E.	S.L.	O.S.O.
S.E. by E.	S.E. c. E.	S.E. q. E.	S.q. L.	S.O. z. O.
S.E.	S.E.	S.E.	Scirocco.	S.O.
S.E. by S.	S.E. c. S.	S.E. q. S.	S. q. O.,or S. q. M.	S.O. z. S.
S.S.E.	S.S.E.	S.S.E.	O.S., or M.S.	S.S.O.
S. by E.	S. c. S.E.	S. q. S.E.	O. q. S.,or M. q. S	S. z. O.
South.	**Sur.**	**Sud.**	**Ostro, or Mezzo Giorno.**	**Suden.**
S. by W.	S. c. S.O.	S. q. S.O.	O. q. L.,or M. q.L.	S. z. W.
S.S.W.	S.S.O.	S.S.O.	O.L., or M.L.	S.S.W.
S.W. by S.	S.O. c. S.	S.O. q. S.	L. q. O.,or L. q. M.	S.W.
S.W.	S.O.	S.O.	Libecio.	S.W. z. S.
S.W. by W.	S.O. c. O.	S.O. q. O.	L. q. P.	S.W. z. W.
W.S.W.	O.S.O.	O.S.O.	P.L.	W.S.W.
W. by S.	O. c. S.O.	O. q. S.O.	P. q. L.	W. z. S.
West.	**Oeste.**	**Ouest.**	**Ponente.**	**Westen.**
W. by N.	O. c. N.O.	O. q. N.O.	P. q. M.	W. z. N.
W.N.W.	O.N.O.	O.N.O.	P.M.	W.N.W.
N.W. by W.	N.O. c. O.	N.O. q. O.	M. q. P.	N.W. z. W.
N.W.	N.O.	N.O.	Maestro.	N.W.
N.W. by N.	N.O. c. N.	N.O. q. N.	M. q. T.	N.W. z. N.
N.N.W.	N.N.O.	N.N.O.	M.T.	N.N.W.
N. by W.	N. c. N.O.	N. q. N.O.	T. q. M.	N. z. W.
Compass Card.	Rosa dé Compas.	Rose de Vents.	Rosa della Bussola, or Fiore del Mondo.	Compass Rose.

Notes.—On the Spanish compass c. stands for cuarto, or ¼; on the French, q. for quart, or ¼; and on the Italian, q. for quarto, or ¼; thus the Italian T. q. G. signifies Tramontana quarto, or ¼ Greco, or N., a quarter of the N.E. division of the compass of 45°, which is expressed by the English N. by E. In the German compass, z. is the abbreviation of zu or zum for the English equivalent "by."

SYSTEM OF ORTHOGRAPHY.

Adopted by the Admiralty for Sailing Directions and Charts.

As far as has been found possible with existing knowledge, native names are spelt in accordance with the following system, which has been adopted by the principal authorities in Great Britain and by the United States, and has been for some years in process of gradual introduction into all Admiralty Sailing Directions and Charts.

No change is made in the orthography of foreign names in countries which use Roman letters; thus French, Spanish, Portuguese, Dutch, &c., names will be spelt as by the respective nations.

1. Where native names have been so long written in a form which, though not in accordance with this system, has become familiar to English eyes from being so spelt in all charts and maps, they are retained.

2. The true sound of the word as locally pronounced is taken as the basis of the spelling.

3. An approximation to the sound is alone aimed at. A system which would attempt to represent the more delicate inflections of sound and accent would be so complicated as only to defeat itself.

4. The broad features of the system adopted are that vowels are pronounced as in Italian and consonants as in English, *every letter being pronounced.* Two accents only are used :—

(1) The acute, to denote the syllable on which stress is laid. The use of this is very important, as the sounds of many names are entirely altered by the misplacement of this "stress."

(2) The sign ⌣ over the letter U to denote the short sound of that vowel under certain circumstances. (*See* Table.)

5. When two vowels come together, each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai*, *au*, *ei*.

The amplification of the rules is given below.

Information is invited as to the proper spelling of native names, so as to produce the nearest approximation to the true sound, by this system.

Letters.	Pronunciation and Remarks.	Examples.
a	*ah*, *a* as in *father* - - - - -	Java, Banána, Somáli, Bari.
e	*eh*, *e* as in *bet*; *a* as in *fate* - - -	Tel-el-Kebír, Oléleh, Yezo, Levúka, Peru.
i	English *e*; *i* as in *ravine*; the sound of *ee* in *beet*. Thus, not *Feejee*, but	Fiji, Hindi.
o	*o* as in *mote* - - - - - -	Tokyo.
u	long *u* as in *flute*; the sound of *oo* in *boot*. *oo* or *ou* should never be employed for this sound. Thus, not *Zooloo* or *Zoulou*, but	Zulu, Sumatra.

Letters.	Pronunciation and Remarks.	Examples.
	The shorter sound of the different vowels, when necessary to be indicated, can be expressed by doubling the consonant that follows. The sounds referred to are as follows :—	Yarra, Tanna, Mecca, Jidda, Bonny.*
	The short *a* as in *fatter*, as compared with the long *a* as in *father*.	
	The short *e* as in *better*, as compared with the long *e* as in *me*.	
	The short *i* as in *sinner*, as compared with the long *i* as in *wine*.	
	The short *o* as in *sobbing*, as compared with the long *o* as in *sober*.	
	The short *u* as in *rubber*, as compared with the long *u* as in *rubric*.	
ŭ	is the same short sound of *u* as is denoted by doubling the consonant following, but is used, and only used, where such doubling is impossible, as in the case of words where *u* is followed by two different consonants, as in *Tŭng*, pronounced as the English *tongue*.	
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound.	Nuulúa, Oosima.
ai	English *i* as in *ice* - - - -	Shanghai.
au	*ow* as in *how*. Thus, not *Foochow*, but	Fuchau.
ao	is slightly different from *au* - - -	Macao.
aw	when followed by a consonant or at the end of a word as in *law* - - - thus	Cawnpore.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from *ey* in the English *they*, or *ei* in *eight*.	Beirút, Beilul.
b	English *b*.	
c	is always soft, but is so nearly the sound of *s* that it should be seldom used.	Celébes.
	If *Celébes* were not already recognised it would be written *Selébes*.	
ch	is always soft as in *church* - - -	Chingchin.
d	English *d*.	
f	English *f*. *Ph* should not be used for the sound of *f*. Thus, not *Haiphong*, but	Haifong, Nafa.
g	is always hard. (Soft *g* is given by *j*) -	Galápagos.
h	is always pronounced when used.	
hw	as in *what*; better rendered by *hw* than *wh*, or *h* followed by a vowel. Thus, *Hwang ho*, not *Whang ho* or *Hoang ho*.	Hwang ho, Ngan hwei.
j	English *j*. *Dj* should never be put for this sound.	Japan, Jinchuen.

* The *y* is retained as a terminal in this word under Rule 1. The word is given as a familiar example of the alteration in sound caused by the second consonant.

Letters.	Pronunciation and Remarks.	Examples.
k	English *k*. It should always be put for the hard *c*. Thus, not *Corea*, but	Korea.
kh	The Oriental guttural - - - -	Khan.
gh	is another guttural, as in the Turkish -	Dagh, Ghazi.
l, m, n	As in English.	
ng	has two separate sounds, the one hard as in the English word *finger*, the other as in *singer*. As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	As in English.	
ph	As in *loophole* - - - - - -	Mokpho, Chemulpho.
th	stands both for its sound in *thing*, and as in *this*. The former is most common -	Bethlehem.
q	should never be employed; the sound of *qu* in *quiver* is given as *kw*. When *qu* has the sound of *k*, as in *quoit*, it should be given by *k*.	Kwangtung.
r	As in English.	
s	As in *sin*.	
sh, t, v, w, x	As in English.	
y	is always a consonant, as in *yard*, and therefore should never be used as a terminal, *i* or *e* being substituted.	Kikūyu.
	Thus, not *Mikindány* or *Wady*, but	Mikindáni, Wadi.
	not *Kwaly*, but	Kwale.
z	English *z* - - - - - - -	Zulu.
zh	French *j*, or as *s* in *treasure* - - -	Muzhdaha.
	Accents should not generally be used, but where there is a very decided emphatic syllable or stress which affects the sound of the word, it should be marked by an *acute* accent.	Tongatábu, Galápagos, Paláwan, Saráwak.

In the case of native names in countries under the dominion of other European powers, in whose maps, charts, &c., the spelling is given according to the system adopted by that power, such orthography is, as a rule, disregarded, and the names are spelt according to the British system. Thus the island east of Java in possession of the Dutch is spelt Madoera by them, but on Admiralty charts Madura. A town in Java appears on Dutch charts as Tjilatjap; in the British, Chilachap.

When a foreign language is written in a vocabulary of fixed sounds, so as to permit of transliteration into the British system, a table of equivalents

for each letter is drawn up, and names of places can be transliterated without regard to pronunciation.

To reduce Greek names to the orthographic form, required by the foregoing system, would require so many changes that it has been decided to defer the revision of Admiralty publications until the system has been more generally introduced and used.

The Greek names are therefore left for the present in their old shape, but these give in most cases a very erroneous idea of the sound of the names, as pronounced by Greeks, and in many cases the modern Greek spelling gives a clue to the pronunciation by aid of the table of equivalents.

Thus	Ευβοια	now spelt	Eubœa	is pronounced	Evvia.
,,	Χαλκις	,,	Chalcis	,,	Khalkis.
,,	Κεφαλληνια	,,	Cephallonia	,,	Kefallinia.

Whenever C appears in a Greek name as at present written it may be taken for granted it has the sound of K.

Greek Letters		Roman Equivalents by Admiralty System	Greek Letters		Roman Equivalents by Admiralty System
Α	α	a	Ρ	ρ	r
Β	β	v	Σ	σ ς	s
Γ	γ	g	Τ	τ	t
Δ	δ	d	Υ	υ	i
Ε	ε	e	Φ	φ	ph
Ζ	ζ	z	Χ	χ	kh
Η	η	i	Ψ	ψ	ps
Θ	θ	th	Ω	ω	o
Ι	ι	i	ΑΙ	αι	ei
Κ	κ	k	ΕΙ	ει	i
Λ	λ	l	ΟΙ	οι	i
Μ	μ	m	ΟΥ	ου	u
Ν	ν	n	ΥΙ	υι	i
Ξ	ξ	x	ΑΥ	αυ	aph, av
Ο	ο	o	ΕΥ	ευ	eph, ev
Π	π	p	ΗΥ	ηυ	iph, iv

INFORMATION RELATING TO CHARTS, SAILING DIRECTIONS, AND GENERAL NAVIGATION.

ON THE CORRECTION OF CHARTS, SAILING DIRECTIONS, AND LIGHT LISTS.

THE three descriptions of publications as guides to navigation, which are affected by the continual changes and alterations that take place, are the Charts, the Sailing Directions, and the Light Lists.

Of these the Charts should always be, so far as our knowledge permits, absolutely correct to date; the Sailing Directions, however, cannot, from their nature, be so corrected, and *in all cases where they differ from charts, the largest scale chart must be taken as the guide for navigation.*

The Light Lists are published annually.

1. Charts.—When issued to a ship on commissioning, the charts have received all necessary corrections to date. As sent from the Hydrographic Department they are correct to the date of issue as stamped on each folio. They then receive such corrections by hand in the depôts as are required, and are so issued to the ships.

The charts in the folios should have the same number and title as shown against each in the Lists pasted on the outside of the folio. The Navigating Officer is to satisfy himself that they do so agree before signing the receipt for the charts, &c.

All small but important corrections affecting navigation that can be made by hand are notified by Notices to Mariners, and should at once be placed on the charts to which they refer, in accordance with the following uniform system:—

1. All corrections, additions to, erasures on Charts are to be neatly made in red (except as explained in paragraph 10 *d*). In every case the recognised Chart abbreviations are to be used. (*See* Admiralty Chart D. 11.)

2. The number and date of every Notice to Mariners, from which corrections, &c., as above, have been made, are to be entered in red at the lower left-hand corner of the Chart, in the following manner, viz.:—

(07) 123, 1145, 1503; (08) 232; (10) 1506, 1721; (11) 34, &c., and in no other place or form (except as explained in paragraph 10 *d*).

3. *General Remarks.*—The amount of information to be inserted on a Chart is to be in accordance with that already engraved on such Chart.

4. *The year date* is to be inserted against wrecks, reported shoals, channels dredged, depth of water on bars or in shifting channels, and irregularity of lights, but only on the largest scale chart affected.

5. *On the Coast Charts* full particulars of lights and fog signals are to be inserted where possible, omitting minor details of lights and fog signals of harbours.

6. *On Charts of smaller scale than Coast Charts* lights and fog signals of harbours are not to be inserted, and particulars of other

lights and fog signals are to be lessened as the scale of the Chart decreases, omitting details in the following order:—

For lights—(1) Height, (2) Period, (3) No. in Group, (4) Visibility, thus:—

Lt. Gp. Fl., (3) Red. ev. 20 sec. 150 ft., vis. 12 m.

(1) Lt. Gp. Fl., (3) Red. ev. 20 sec. vis. 12 m., (2) Lt. Gp. Fl., (3) Red. vis. 12 m.

(3) Lt. Gp. Fl. Red. vis. 12 m., (4) Lt. Gp. Fl. Red.

For fog signals, thus:—(1) Fog Siren, 2 ev. min., (2) Fog Siren, ev. min., (3) Fog Siren.

7. *On Ocean Charts* lights visible 15 miles or over are alone to be inserted, and then only their character and colour, *e.g.*, Lt. Alt., Lt. Gp. Fl., Lt. Occ., Lt. F.R.

8. *Light-buoys.*—No period is to be inserted against a light-buoy except in large scale plans; on ordinary scales only the character, *e.g.*, Lt. Occ., Lt. Fl.

9. *On Coast Charts* inner harbour buoys and beacons are not to be inserted, and on small scale coast charts only the outer buoys.

10. *Arrangement of Writing, &c.*—Writing is to be as much as possible clear of the water, unless the objects referred to are on the water:—

(*a*) When inserting corrections, care must be taken not to obliterate any of the other information already on the chart.

(*b*) When "Notes" are to be inserted (such as Cautionary, Tidal, &c.), they should be written in a convenient but conspicuous place, where they will not interfere with any other details.

(*c*) *Erasures* are never to be made. Where necessary, the details to be corrected are to be crossed through in red ink.

(*d*) *Temporary or intended changes* are to be inserted on the chart in pencil, with the number and year of the Notice to Mariners against them, thus:—N. to M. $\frac{43}{1913}$ temp. (which is also to be repeated in pencil *below* the "small corrections" dates at the lower left-hand corner of the chart), and in the case of intended changes, the particulars finally inked in, in red, when further notice has been received that the changes have been made. In the case of temporary changes, the pencil notations are to be rubbed out when a further Notice has been received cancelling them.

Charts, when received from a Chart Depôt or direct from the Hydrographic Department, will *not* have received the above-mentioned pencil corrections, but on first supply of a Chart Set, a copy of the latest Notice to Mariners, containing a List of all Notices to Mariners of a Temporary character and Preliminary Notices which are still in force *by which any Charts are temporarily affected*, will be specially handed to the Navigating Officer or attached to Chart Set, and the first duty of the Navigating Officer will be to make the necessary corrections in pencil to the charts affected.

11. One copy of all Notices to Mariners is to be pasted into the Sailing Directions, in its appropriate place, so that if fuller detail is required than what the scale of the chart permits to be given, it will be found on the proper page referring to the given locality or subject.

12. Unmounted Sets of Charts supplied for the personal use of the Admiral, Atlas folios supplied for information of Officers and Junior Officers, and Charts for Ships' Company, are stamped, "Not to be used for Navigation," and need not, therefore, be kept corrected.

2. Sailing Directions are not corrected before issue, but on page iii. in the "Advertisement" to each volume will be found the number of the last Notice to Mariners used in its revision; the numbers of the subsequent Notices affecting it between going to press and issue to H.M. Ships are given in the Notice to Mariners announcing its publication.

Supplements and Revised Supplements referring to each volume are published from time to time. Supplements contain all the information received up to date since the publication of the volume to which they refer, and a Revised Supplement cancels the previous Supplements.

The existence of a Supplement is to be noted in the tabular form placed for the purpose inside the cover of each volume, and also on receipt of a further Revised Supplement after commission. Two copies are issued to each ship, one of which is to be retained intact, for reference, notations referring to it being made on the pages of the Sailing Directions affected; the other copy may be cut up, if considered desirable, the slips being pasted in the volume at the appropriate place.

In the advertisement to each Supplement will be found the number of the last Notice to Mariners used in its compilation.

In January of each year, a summary of the information affecting each volume of Sailing Directions, which has been published during the preceding year in Notices to Mariners, is issued as a separate publication. If a Supplement or Revised Supplement has been issued during the year, or is in preparation, this summary will only include Notices to Mariners issued since the date of such Supplement.

Notices to Mariners prior to the date of issue of a Chart Set from a Chart Depôt are supplied with the set, to complete the interval between the last published Supplement, Revised Supplement, or Summary of Notices to Mariners, and the issue of the Chart Set, and an early duty of the Navigating Officer after drawing a Chart Set is to correct the Sailing Directions from the Supplements or Revised Supplements, Annual Summaries of Notices to Mariners, and Notices to Mariners supplied with the Chart Set.

One copy of each Notice to Mariners should be pasted into the Sailing Directions in its appropriate place as soon as received.

It must, however, be thoroughly understood that Sailing Directions will never be correct in all minor details, except up to the date of the last Supplement or Revised Supplement, and that, when differences exist, the charts, which should be corrected from the most recent information, should be taken as the guide; for which purpose, for ordinary navigation, they are sufficient.

3. The Light Lists, published annually early in each year, are not corrected in the depôts before issue, but appendices are issued every week with the weekly copies of Notices to Mariners, giving the alterations that have taken place.

It is the duty of the Navigating Officer when he receives the Chart Set to make notations in the Light Lists from these appendices, and from Notices to Mariners of later date; and to keep them so corrected from time to time.

The Light Lists should always be consulted as to the details of a light, as the lights are not described in the Sailing Directions. A red label to this effect is inserted opposite page 1 of all Sailing Directions. The charts also may not be equally up-to-date in some details, for which no Notices to Mariners have been issued.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

1. *Reliance on a Chart.*—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger is the scale of the chart.

To estimate this, the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of Coast sheets, which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published.

It must be borne in mind that the only method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines; that each time the lead descends it only ascertains the depth of water over an area equal to the diameter of the lead, that is about two inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a width of two inches.

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor, are made on a scale of three inches to the mile, and surveys of frequented ports, or harbours likely to be used by Fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large scale Coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, *i.e.*, of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper: —

16	15	15	13	13	14	12	11	10	9
14	15	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	10	9
16	16	17	18	16	12	11	8½	9	10
18	17	15	12	9	7½	7½	7½	9	10
19	16	12	9	5½	4½	5½	6½	8½	9
22	19	16	10	5½	5½	6½	7½	8½	10
20	16	12	7½	5½	6½	6½	7½	8½	10
18	15	11	9	7½	7	7½	8½	10	11
23	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear weather, on account of the observer being within five feet of the surface; none in turbid seas. If, therefore, there is no inequality in the soundings to cause suspicion, a shoal patch between two lines may occasionally escape detection.

Lines of soundings plotted as close as may be practicable on a scale of 6 inches to the mile would be 100 feet apart, and each line would be only 2 inches in actual width.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape the lead; whilst in a chart on a scale of 6 inches, inequalities as large as battle-ships, if lying parallel to, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General Coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the contour line of 10 fathoms, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile, vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead will not rest on them.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch.

A wide berth should therefore be given to every rocky shore or patch, **and this rule should be invariably followed, viz., that instead of considering a coast to be clear, unless it is shown to be foul, the contrary should be assumed.**

2. *Fathom Lines a Caution.*—Except in plans of harbours that have been surveyed in detail, the five-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, as before mentioned, another warning, especially for ships of heavy draught.

Charts where no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed round, as there is no knowing how closely the spot may have been examined.

3. *Chart on largest scale always to be used.*—It sometimes happens that, from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or soundings. This is an additional reason, besides the obvious one of the greater detail shown, why this largest scale chart should always be used for navigating.

4. *Caution in using Small Scale Charts.*—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile. This is particularly to be observed when coming to an anchor on a narrow ledge of convenient depth at some distance from the shore.

For the same reason bearings to objects near should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

5. *Graduation.*—All Plans are now being graduated in skeleton style before publication in order to facilitate easy reference to Astronomical positions; previously published plans are also graduated as opportunity offers. The graduation is, however, of necessity, often based upon imperfect information of a conflicting nature; for this reason, whenever an Astronomical position is quoted other than approximate (*i.e.*, when seconds are given), it is necessary to quote also the number of the particular chart from which the position has been derived.

6. *Distortion of Printed Charts.*—The paper on which charts are printed has to be damped. On drying, distortion takes place from the inequalities in the paper, which greatly varies with different paper and the amount of the original damping; but it does not affect

navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree, when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

7. *Buoys.*—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should therefore be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings or angles of fixed objects on shore and not by buoys.

Light-buoys.—The lights shown by light-buoys cannot be implicitly relied on, as, if occulting or flashing, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British islands are from 5 to 217 candle power.

8. *Lights.*—Circles drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Light Lists and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to height, at the beginning of each Light List, affords a means of ascertaining how much more or less the light is visible should the height of the bridge be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the standard compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its order, or candle power, as given in the Light Lists, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles, if of any power. (*See* table in Light List before mentioned.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

9. *Fog Signals.*—Sound is conveyed in a very capricious way through the atmosphere. Apart from wind, large areas of silence have been found in different directions and at different distances from the fog signal station, in some instances even when in close proximity to it. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly towards the land, and is not observed by the people at a station until it is upon them; whereas a ship may have been for many hours in it, and approaching the land. In such a case no signal may be made. When sound has to travel against the wind, it may be thrown upwards; in such a case, a man aloft might hear it when it is inaudible on deck. Under certain conditions of the atmosphere, when a fog signal is a combination of high and low notes, one of the notes may be inaudible.

The mariner should not assume—

a. That because he fails to hear the sound, he is out of hearing distance.

b. That, because he hears a fog signal faintly, he is at a great distance from it.

c. That, because he hears the sound plainly, he is near it.

d. That, because he does not hear it, even when in close proximity, the fog signal has ceased sounding.

e. That the distance from and the intensity of the sound on any one occasion, are a guide to him for any future occasion.

Taken together, these facts should induce the utmost caution in closing the land in fogs. The lead is generally the only safe guide.

10. *Tides and Tidal Streams.*—In navigating coasts where the tidal range is considerable, caution is always necessary. It should be remembered that there are indraughts to all bays and bights, although the general run of the stream may be parallel to the shore.

The turn of the tidal stream off-shore is seldom coincident with the time of high and low water on the shore. In open channels, the tidal stream ordinarily overruns the turn of the vertical movement of the tide by about three hours, forming what is usually known as tide and half-tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

In crossing a bar or shallow flats, Tidal diagrams to show the height of the tide at any time for any place, given in the Tide Tables, will be found of great assistance in calculating how much the water has risen or fallen at any hour of the tide.

On coasts where there is much diurnal inequality in the tides, the amount of rise and fall can never be depended upon, and additional caution is necessary.

It should also be remembered that at times the tide falls below the mean level of low water springs. This always occurs on the coasts of Europe at the equinoxes, but in other parts of the world, and especially in the tropics, such periodic low tides may coincide more frequently with the solstices. Wind or a high barometer may produce it at any time, and the amount varies with locality. When the moon's perigee coincides with the full or new moon the same effect is often produced.

11. *Arrows* on charts only show the most usual or the mean direction of a tidal stream or current. It must never be assumed that the

direction of a stream will not vary from that indicated by the arrow. In the same manner, the rate of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

12. *Fixing position.*—The most accurate method of fixing a position relative to the shore is by angles between well-defined objects on the chart. All ships are supplied with a station-pointer, and this method should be used whenever possible.

Two things are, however, necessary to its successful employment: First, that the objects be well chosen; and, second, that the observer is skilful and rapid in his use of the sextant and station-pointer.

For the former, reference can be made to the pamphlet on the use of the station-pointer, which is in every chart box; the latter is only to be obtained by practice.

It will readily be seen that in war time, when the compass may be knocked away, or gun-fire may make it undesirable to expose the person more than necessary, a sextant offers great advantages, as angles can be obtained from any position whence the objects are visible. It is this contingency that makes it especially desirable that all navigating officers should become expert in this method of fixing a ship's position.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

It is not intended that the use of the compass to fix the ship should be given up; there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed. In all cases where great accuracy of position is desired, angles should invariably be used, such as the fixing of a rock or shoal, or of additions to a chart of fresh soundings or new buildings. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. In the case of ordinary soundings, it is only necessary to take a third angle now and then; firstly, to check the general accuracy of the chart, as above stated; secondly, to make certain that the more important soundings, as at the end of a line, are correctly placed.

Sometimes, when only two objects are visible, a compass bearing and sextant angle may be used with advantage.

In passing near a point of land, or an island, the method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "four-point bearing," when the bearing is taken four points on the bow and on the beam, the distance from the object at the latter position being the distance run between the times of taking the two bearings, allowing for current, gives an excellent fix for a departure but does not ensure safety, as the point and probably the rocks off it are abeam before the position is obtained.

By taking the bearings of two points and four points on the bow, a very good position is obtained before the object is passed; the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current.

This is, however, only strictly true if the current is directly with or against the course of the ship. If a cross current has to be allowed for, the results by this method may be altogether erroneous and misleading. The following example shows in a tabular form the errors that might be produced by accepting the distance run in the interval, allowing for current, as the distance of the object at time of second bearing.

Example: A vessel steering East sights a light bearing E.N.E., or two points on the bow; one hour after, having run in the interval 10 miles by log, the light bears N.E., *i.e.*, she has doubled the angle on the bow. Current, in all cases, at the rate of 2 miles an hour.

Direction of Current	Distance run between 1st & 2nd Bearings		Distance of Light at 2nd Bearing	Direction of Current	Distance run between 1st & 2nd Bearings		Distance of Light at 2nd Bearing
	By Log	Allowing for Current			By Log	Allowing for Current	
	Miles	Miles	Miles		Miles	Miles	Miles
East -	10	12	12	West -	10	8	8
E.N.E. -	10	11·8	10	W.S.W. -	10	8·2	10·2
N.E. -	10	11·4	8	S.W. -	10	8·7	11·9
N.N.E. -	10	11	6·2	S.S.W. -	10	9·4	13·6
North -	10	10·2	5·3	South -	10	10·2	14·7
N.N.W -	10	9·4	4·9	S.S.E. -	10	11	15
N.W. -	10	8·7	5·3	S.E. -	10	11·4	14·7
W.N.W -	10	8·2	6·1	E.S.E. -	10	11·8	13·8

The following rule should be observed in all cases of a cross current, viz.:—

When the angle between the second bearing and the course made good (over the ground) is double the angle between the first bearing and the course made good (over the ground) the distance from the object is equal to the distance made good (over the ground) between the times of the first and second bearings.

To get a reliable result the difference between the first bearing and the course made good (over the ground) should never be less than 20°. It follows, therefore, that it is necessary, before observing the first bearing, to decide upon the course being made good (over the ground). This may be done as follows, viz.:—

From any point, A, on the chart draw a line A B, representing by its direction the course steered and by its length the speed through the water. From the point B, draw another line, B C, representing in a similar manner the estimated direction and rate of the current, &c., to be allowed for. Then a line joining the points A and C will represent in the same manner the course and speed which are being made good (over the ground).

A table of factors, by which to multiply the distance run, to obtain the distance of the object when any number of degrees between the two bearings has been observed, is supplied with all chart sets.

The use of a danger angle in passing outlying rocks with land behind should also not be forgotten. In employing this method, however, caution is necessary, as should the chart be not accurate, *i.e.*, should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not, therefore, be employed when the survey is old or manifestly imperfect

In fixing by the compass, it must always be remembered that two bearings only are liable to error. An absolute error may be made in either bearing observed; errors may be made in applying the deviation; or errors may creep in in laying them on to the chart. For these reasons, a third or check bearing of some other object should be taken, especially when near the shore or dangers. The coincidence of these three lines will prevent any mistakes.

Amongst astronomical methods of fixing a ship's position, attention is drawn to the great utility of Sumner's method. A Sumner line, that is, a line drawn through the position (obtained by an assumed latitude or longitude) at right angles to the bearing of the sun, as obtained from the azimuth tables, gives at times invaluable information, as the ship must be somewhere on that line, provided the chronometer is correct. A deep cast of the lead at the same time may often serve to give an approximate position on the line. An early and very accurate position can also be obtained by Sumner's method, by getting a Sumner line by a bright star at daylight when the horizon is well visible, and another Sumner line by the sun when a few degrees above the horizon, or, better still, by observing two or more stars at twilight. The Sumner lines thus obtained will, if the bearing of sun and star differ three points or more, give an excellent result.

13. *Change of Variation of the Compass.*—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a quarter of a point, but the chart plates cannot be corrected more frequently from the impossibility of making alterations often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles, and in the English Channel about 5° in 400 miles. The Variation Chart should be consulted on this head.

On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation Chart. One or two *isogonic lines* are also sometimes placed on charts, in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses.

14. *Local Magnetic Disturbance of the Compass on board Ship.*—The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places on the globe.

Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local centre of magnetic force

of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

15. *Use of Oil for Modifying the Effect of Breaking Waves.*—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:—

1. On free waves, *i.e.*, waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow—*e.g.*, from the cathead—and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bár with a flood tide, oil poured overboard and allowed to float in ahead of the boat which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides; if used only aft the tow alone gets the benefit.

16. *Concise Rules for Revolving Storms*:—

1. Revolving storms are so named because the wind in these storms revolves round an area of low pressure situated in the centre. They have also local names, and are termed hurricanes in the West Indies and South Pacific Ocean; cyclones in the Indian Ocean, Bay of Bengal, and Arabian Sea; and typhoons in the China Sea.

2. In these storms the wind always revolves the same way in the same part of the world, that is, against the movement of the hands of a watch in the northern hemisphere, and with the hands of a watch in the southern hemisphere. The wind does not revolve in circles, but has a spiral movement, inwards, towards the centre.

3. Revolving storms have also, as a general rule, a progressive movement. Within the tropics they usually move from east to west at first, and then curve towards the pole of the hemisphere in which the storm is generated, and afterwards move from west to east.

4. The track which the centre of the storm takes is called the path of the storm, and the portion of the storm-field on the right of the path is known as the right-hand semicircle, and that on the left as the left-hand semicircle of the storm.

5. In the right-hand semicircle, if the observer be stationary, the wind will always shift to the right, and in the left-hand semicircle to the left. This law holds good in both hemispheres.

6. If a vessel be so situated in a storm that running before the wind the path of the advancing storm will be crossed, this is considered to be the dangerous semicircle. This will always be the right-hand semicircle in the northern hemisphere, and the left-hand in the southern.

7. These storms are most frequent in the northern hemisphere from July to November, and in the southern hemisphere from December to May. In the Bay of Bengal and Arabian Sea they, however, occur most frequently about the time of the change of the monsoon.

8. The area over which revolving storms have been known to extend varies in diameter from 20 miles to some hundreds of miles, and their rate of movement in the West Indies averages about 300 miles a day; in the China Sea, Bay of Bengal, and Arabian Sea about 200 miles a day; and in the Indian Ocean from 0 to 200 miles a day, the more stationary storms occurring at the beginning and end of the hurricane season.

9. The indications of the approach of a revolving storm are (1) an unsteady barometer, or even a cessation in the diurnal range, which is constant in settled weather; (2) a heavy swell not caused by the wind then blowing; (3) an ugly, threatening appearance of the sky.

10. In order to judge what is the best way to act if there is reason to believe a storm is approaching, the seaman requires to know (*a*) in which direction the centre of the storm is situated, (*b*) in which semicircle the ship is situated.

11. As these points cannot be determined if a vessel is moving with any speed through the water, the first proceeding should be to "stop" or "heave to," and, as it is always best to assume, at first, that the vessel may be in the dangerous semicircle, she should be hove to on the starboard tack in the northern hemisphere, and on the port tack in the southern.

12. If an observer faces the wind the centre of the storm will be from 12 to 8 points on his right hand in the northern hemisphere, and on his left hand in the southern hemisphere; 12 points when the storm begins; about 10 points when the barometer has fallen three-tenths of an inch, and about 8 points when it has fallen six-tenths of an inch or upwards.

13. If the wind shifts to the right the vessel is in the right-hand semicircle, if to the left in the left-hand semicircle, and, if the wind is steady in direction, but increasing in force, she is in the direct path of the storm.

14. If the seaman has reason to think that his vessel is in the direct path of the storm he should run with the wind on the starboard quarter in the northern, and on the port quarter in the southern, hemisphere until the barometer has ceased falling. If she is in the right-hand semicircle in the northern hemisphere she should remain hove to on the starboard tack, but if in the southern hemisphere run with the wind on the port quarter; if she is in the left-hand semicircle in the northern hemisphere she should run with the wind on the starboard quarter, but if in the southern hemisphere remain hove to on the port tack.

15. Should a vessel not have sufficient room to run when in the least dangerous semicircle, she should heave to on the port tack in the northern, and on the starboard tack in the southern, hemisphere.

16. If in a harbour or at anchor the seaman should be just as careful in watching the shifting of the wind and ascertaining the direction of the centre, as by so doing he will be able to tell on which side of the path of the storm he is situated, and be able to act according to circumstances.

17. Should the centre of a storm pass over a vessel, the wind, after blowing furiously in one direction, ceases for a time, and then blows with equal fury from the opposite direction. This makes a confused pyramidal sea, which is especially dangerous.

IN THIS WORK THE BEARINGS ARE ALL TRUE, IN DEGREES, FROM 0° (NORTH) TO 360°, MEASURED CLOCKWISE.

THE LATITUDES AND LONGITUDES GIVEN IN THE TEXT ARE APPROXIMATE.

THE VARIATION GIVEN IN THE SEVERAL PAGES IS FOR THE YEAR 1913.

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

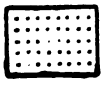
THE DISTANCES ARE EXPRESSED IN SEA MILES OF 60 TO A DEGREE OF LATITUDE.

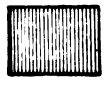
A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO 100 FATHOMS, OR THE TENTH PART OF A MILE.

THE SOUNDINGS ARE REDUCED TO LOW WATER OF ORDINARY SPRING TIDES.

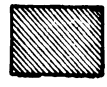
HEIGHTS ON THE LAND ARE GIVEN ABOVE HIGH WATER OF ORDINARY SPRING TIDES.

WHEN SHADING IS USED TO INDICATE COLOURS OF FLAGS OR BEACONS, IT IS AS FOLLOWS:

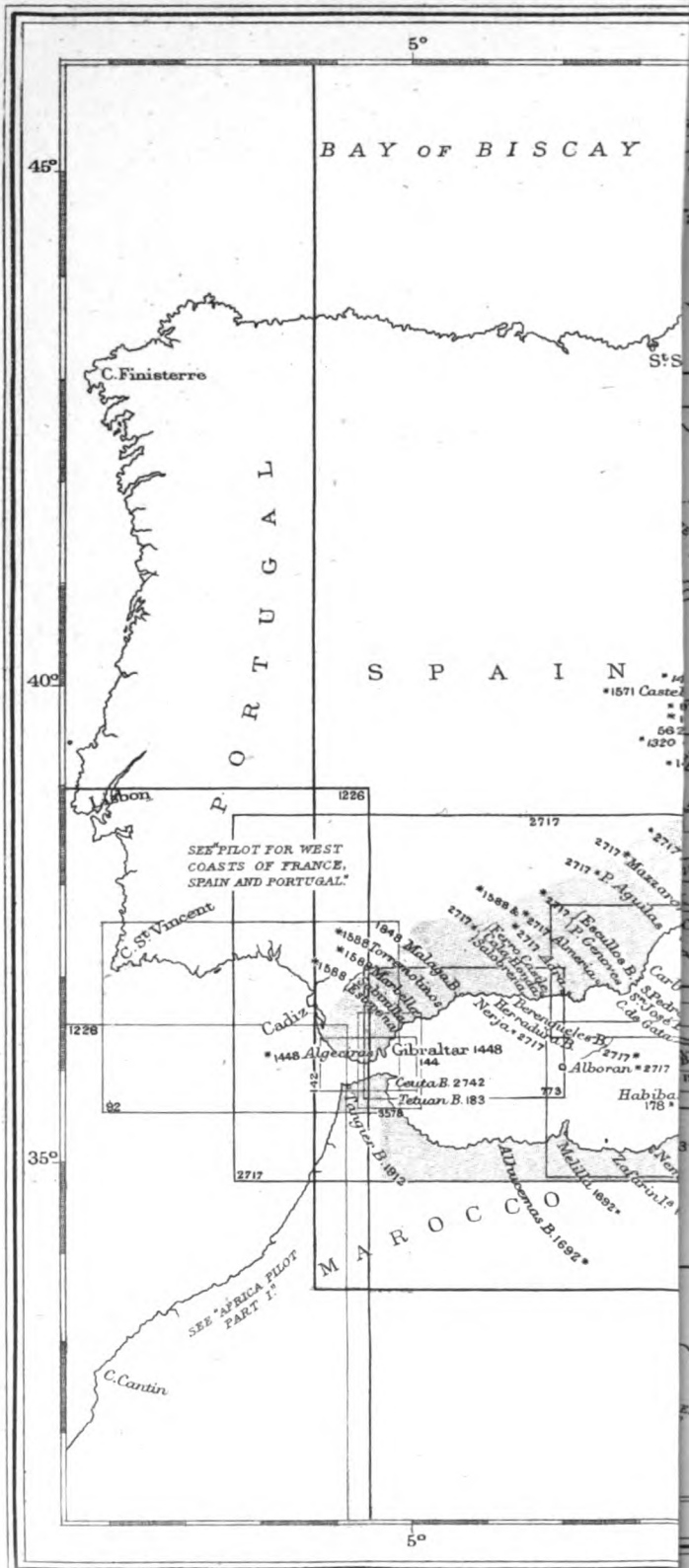

Yellow.


Red.


Blue.


Green.


Black.



No. 5 A Mediterranean Pilot, Vol. I.

For details of sectors and the latest information respecting the Lights which are included in this work, seamen should consult the Admiralty List of Lights, Part V. This List is published early in every year, corrected to the preceding 31st December.

THE

MEDITERRANEAN PILOT,

VOL. I.

CHAPTER I.

GENERAL REMARKS.—SOUTH AND SOUTH-EAST COAST OF SPAIN.—MAROCCO.—ALGERIA.—TUNIS.—MALTESE ISLANDS.—SICILY.—LIPARI ISLANDS.—SARDINIA.—COMMUNICATIONS.—WINDS AND WEATHER.—CURRENTS.—TIDES.—TIDAL STREAMS.—TIDAL RACES.—LIGHTS.—PILOTAGE.—BUOYAGE.—PORT REGULATIONS.—SIGNAL STATIONS.—COAL SUPPLY.—NAVAL ESTABLISHMENTS.—DOCKS.—TUNNY FISHERIES.—PASSAGES.

Chart 449, Mediterranean sea.

GENERAL REMARKS.—The Mediterranean sea, the Mare Internum of the ancients, bounded by the coasts of Europe, Asia, and Africa, is comprised between the parallels of 30° 15′ and 45° 50′ N. latitude, and the meridians of 5° 21′ W. and 36° 10′ E. longitude; its length from Gibraltar to its easterly extremity in Syria is about 2,100 miles; and its greatest breadth, from the head of the Adriatic to the Gulf of Sidra, about 1,000 miles. Its area being about 800,000 square miles.

The Italian and Grecian peninsulas divide the northern part of the Mediterranean into three principal sections, designated the Tyrrhenian, the Adriatic, and Ægean seas; its southern shores, with the exception of the Gulf of Sidra, have no important indentations.

These sections of the Mediterranean sea are included within two great divisions, separated from each other by a submarine elevation which joins Italy to Sicily, Malta and the African coast, and are generally recognised as the western and eastern basins. The western basin, bounded by the coasts of Spain, France, Italy, Tunis, Algeria, and Marocco, begins outside the Mediterranean proper in the submarine ridges west of Tangier, which, joining Spain to Africa, separates the deep water of the Atlantic from that of the Mediter-

(4739) Wt. 45349/420 (120). 4,000.—1/17. T.G.E. A

Chart 449, Mediterranean sea.

ranean, this western basin is 1,060 miles in length east and west, by 460 miles in breadth. The eastern basin, bounded by the coasts of Italy, Austria, Greece, Turkey, Egypt, Tripoli, and Tunis, is, including the Adriatic, about 1,300 miles in length by 1,000 miles in breadth; the distance however between the coasts of Crete and Egypt is only 160 miles. The greatest known depths are, in the western basin, 1,723 fathoms, off the west coast of Sardinia, and, in the eastern basin, 2,408 fathoms, south-westward of Cape Matapan.

The states bordering the Mediterranean are Spain, France, Italy, Austria-Hungary, Montenegro, Turkey, Greece, Egypt, Tripoli, Tunis, Algeria, and Marocco; within it are small but important possessions of Great Britain. The Mediterranean is joined to the Atlantic by the Strait of Gibraltar; and to the Black sea, and Sea of Azov by the Dardanelles, Sea of Marmara, and the Bosporus; whilst the Suez canal permits vessels to sail from the Mediterranean into the Red sea, and consequently to all parts of the East.

The principal elevations of the various mountain ranges approaching the Mediterranean shores are the Sierra Nevada, in Spain, 11,660 feet high; Mont Canigou (Pyrennees), in France, 9,138 feet; Monte Moungioje (Maritime Alps), in Italy, 8,632 feet; and Monte Corno (west side of the Adriatic), 9,508 feet; Mount Kom (Montenegro), 9,300 feet; Mount Olympus, in Turkey, 9,754 feet; Mount Elias, in Morea, 7,900 feet; Ak Dagh, in Asia Minor, 10,000 feet; Dhor el Khodib, the highest peak of Lebanon, in Syria, 10,060 feet; and Lella Kudal, in Algeria, 7,572 feet, above the level of the sea.

The largest islands are Sardinia, Sicily, Crete, Corsica, Cyprus, Negropont, Majorca, and Mitylene.

The distinctive names given to the several portions of the western basin are the Balearic sea, or Sea of Valencia, between the Balearic islands and the coast of Spain; the Ligurean sea on the north; and the Tyrrhenian or Italian sea to the east; the coast is also indented by the deep bays, or gulfs, of Lyons and Genoa.

The portion of the eastern basin or Levant, which extends northward from the island of Crete to the coast of Macedonia, is named the Archipelago, and is remarkable for the numerous cluster of volcanic islands and rocks that stud its surface, as also for the boldness and irregularity of the surrounding coast. The chief gulfs are those of Ægina, Saloniki, and Smyrna. The island of Cyprus lies in the angle between the coasts of Asia Minor and Syria.

The Mediterranean coasts are remarkable for difference of altitude and variety of outline. The northern coasts are generally high, steep, and bold, but near the mouths of the Ebro, in Spain, and of the Rhone, in France, as also in parts of the western coasts of Italy the coasts are low, shelving and varied only by a few bold rocky headlands.

The south side of Sicily and the western shores of the Adriatic are

Chart 449, Mediterranean sea.

also, with a few exceptions, flat and sandy: but all along the eastern side of the Adriatic the coast is bold and irregular, often appearing in cliffs which rise 600 or 700 feet perpendicularly above the level of the sea, with deep water close to the shore.

The coasts of Syria, mountainous between Tripoli and Tyre, present in many other places a large extent of low flat land. Near the mouth of the Nile is a low flat, with reefs and shoals, extending in some parts for distances of from 5 to 7 miles from the shore.

The principal rivers flowing into the Mediterranean are, in order of magnitude, the Nile, Rhone, Ebro, and Po. The evaporation of the Mediterranean sea being greater than the quantity of water discharged into it from these tributaries, a compensating supply is partly effected by the continued flow of the waters of the Atlantic, through the Strait of Gibraltar, which constitutes the general easterly current experienced in this sea, and partly by the outward flow from the Black Sea through the Bosporus and Dardanelles into the Mediterranean.

Physical condition.—As previously stated, the Mediterranean is divided into two deep basins, the Eastern and Western, separated from each other by a submarine ridge extending from Sicily to the Tunisian coast; the whole sea being separated from the Atlantic by a submarine ridge in the western part of the Strait of Gibraltar.

The greatest known depth in the western basin is 1,723 fathoms, and in the eastern basin 2,408 fathoms, and the salinity of the water is in excess of the Atlantic; its average specific gravity being 1·028 against 1·026 of the Atlantic. Its temperature from a depth of 100 fathoms to the bottom is uniform at from 55° to 56° F., the eastern basin being slightly warmer than the western, and at the entrance of Gibraltar strait the temperature of the water on the surface is (particularly in the summer) lower on the African than on the European coast.

At moderate depths the sea abounds with fish, particularly sardines and tunny; sharks and seals are also seen, but above a depth of about 200 fathoms, life is less abundant than in Oceanic waters not cut off from the general circulation, and in its greatest depths life appears to be altogether absent.

The coral fisheries are well known: as in no other waters are such beautiful specimens of pink coral to be found.

Tides.—The rise and fall of the tides in the Mediterranean is small, and in many parts so slight and irregular as to be unimportant. A periodical rise and fall of the sea has been observed on the south coast of Spain, the coast of Marocco, the south-east coast of Sicily, in the Adriatic, and on the coast of Syria; while at Sfax, on the east coast of Tunis, there is a regular rise and fall of 5¼ feet at springs and 3½ feet at neaps, and at Gabes 6½ feet at springs and 4½ feet at neaps.

Mention of this tidal movement will be made only in the localities where it is sensibly felt.

Charts 92 and 142.

Depths off-shore, westward of Gibraltar strait.—Between Cadiz and Cape Trafalgar, at 20 miles from the coast, a depth of 100 fathoms is obtained, the bottom being mud and sand on the parallel of Cadiz; sand and shell, between that place and Trafalgar; and course sand and gravel, mixed with rocky substances, as Trafalgar is approached.

Northward of Trafalgar, from the line of 100 fathoms to within 7 miles of the land, the soundings decrease gradually to 25 fathoms, south-westward of the cape, towards Trafalgar or Phare bank and La Aceitera shoal, the depths shoal more rapidly. Between Cape Trafalgar and Cabezos shoals the water is deeper, there being a depth of 30 fathoms within 2½ miles of the shore; the bottom coarse gravel mixed with broken shell, and pieces of rock.

On the African coast south of Cape Spartel, at 20 miles from the coast the water shoals gradually from 100 fathoms (mud), but this bank of soundings narrows as Spartel is approached, and the 100-fathoms line passes 2½ miles northward of the cape, and immediately north-westward of the cape the 100-fathoms line, in a narrow gut, reaches almost within a mile of the cape.

Eastward of Cape Spartel the bank of soundings extends to an average distance of 3 miles from the land, as far as Cires point, whence to Almina point it does not extend further than one mile from the coast, except in Ceuta bay.

The deep water channel, between the contour lines of 100 fathoms on a line with Capes Trafalgar and Spartel is nearly 10 miles in breadth, the bottom being very irregular.

A bank, named The Ridge, about 5 miles long, eastward and westward, and 2 miles wide, between the 100-fathoms line, and having a least depth of 30 fathoms, coral and sand, lies nearly in the middle of the deep water channel in the line between Capes Trafalgar and Spartel, and about 8 miles northward of the latter.

On the meridian of Tangier the deep water channel is about 5½ miles wide and remains at that width until on the meridian of Cires point, from whence it widens out. The bottom in the deep water channel is rock coral, gravel, and broken shell.

Chart 144, Gibraltar.

GIBRALTAR.—This singular rocky promontory, known to British seamen as the Rock of Gibraltar, is a British possession about 2½ miles in length in a north and south direction, by 7 cables in breadth, and its summit is elevated 1,396 feet above high water; it is joined by a low sandy isthmus to the mainland of Spain. It was known to the Phœnicians as Alube, corrupted by the Greeks into Calpe, and is named Gibel Tarik by the Arabs.

Chart 144, Gibraltar.

For many years Gibraltar was the object of various contests between the Moors and Spaniards until the year 1462, when it was ceded to the latter: in 1704 it was taken by, and has since continued in possession of, the British.

Being essentially a military fortress, the Governor in command of the garrison exercises all the functions both of government and legislation, there being no executive or legislative council.

Geology.—The peninsula of Gibraltar has probably been uplifted at a comparatively recent Geological Epoch, as signs of a former beach exist about 450 feet above high water. The basement rock consists mostly of white or pale grey limestone, compact and arranged in beds, above which are a series of dark greyish blue shales, with intercalated beds and bands of grit, sandstone, and limestone, and distributed here and there about the promontory are various limestone breccias, bone breccias, and calcareous sandstone, as well as loose sand.

Flora and fauna.—About 400 flowering plants and ferns are indigenous to Gibraltar, and the white poplar, the cotton tree, the pepper tree or pimento, the ilex and the pine, are the most noticeable of the larger trees; the aloe, prickly pear, and dwarf pine are common.

The fauna is remarkably poor, and consists of rabbits, foxes, partridges, pigeons, and woodcock; the little Barbary apes are few in number.

SUBMARINE VESSELS. — CAUTION. — Submarine vessels are being constantly exercised in the vicinity of Gibraltar.

In order to minimise the risk of collision with other vessels, the vessel escorting the submarines will, when the latter are exercising, display a large red flag at the masthead.

Every vessel seeing this signal should steer so as to give the escorting vessel a berth of at least one mile, and also to pass astern of her; when from any cause this cannot be done, the escorting vessel should be approached at a slow speed until warning is given by flags, semaphore, or megaphone, as most convenient, of the danger zone, a good lookout being kept meanwhile for the submarines, whose presence may be only indicated by their periscopes showing above water.

Population.—In 1911 the population numbered 19,596, excluding the garrison.

Trade.—The staple trade is the supply of coal and stores to shipping, as Gibraltar is a coaling station of great importance. It has also a considerable trade in tobacco, imported in the leaf from the United States and Manilla. The amount of coal supplied to passing vessels in 1910 was 170,942 tons, and in the same year 3,200 steam and 438 sailing vessels entered the port, with aggregate tonnages of 5,438,396 and 44,163 tons respectively.

Chart 144, Gibraltar.

Communication. — Steamships. — Gibraltar has weekly communication with London and Marseille, and fortnightly with Malta, by the Peninsular and Oriental Company's steamers; fortnightly with Plymouth, London, and Marseille by the Orient Pacific line, and fortnightly with Liverpool, Algiers, and Malta by the Moss Steamship Company's vessels. Every six days with London, viâ Marocco, Canary islands, and Madeira, by Messrs. Forward Bros. line. The steamers of the Adria line call every three weeks, proceeding to Malaga, Oran, Algiers, Malta, Catania, Messina, Trieste, and Fiume: and those of the Compañia Transátlantica Española, from Barcelona every month.

Steamers leave daily from Ceuta and Tangier, and there are two steamers daily to Algeciras.

Railways.—There is no direct railway communication, but there is a Spanish railway to Algeciras, the opposite side of Gibraltar bay, and steamers run between Gibraltar and Algeciras.

Telegraph.—From Gibraltar submarine cables are laid as follows:—Two to Lisbon, one to Vigo, one to England, one to Tangier, one to Cadiz, and three to Malta; consequently there is telegraphic communication with all parts.

Time.—Greenwich mean time is kept.

Money.—Measures.—Weights.—British money is the sole legal tender, except for liabilities incurred before 1st October, 1898: Spanish money is, however, largely current. British imperial measures and weights are used.

Climate.—The climate belongs to the sub-tropical zone, with a dry summer and a rainy season in winter; the heats of summer are tempered by sea breezes, but easterly winds are disagreeable, forming a cloud cap on the summit and half-way down the rock. Heavy dews and thick fogs occur in autumn. Meteorological tables will be found in Appendix III.

Chart 2158a, Mediterranean sea, western sheet.

SPAIN.—South and south-east coasts.—The interior of Spain, an elevated tableland whose surface is some two or three thousand feet above the level of the sea, is nearly surrounded by mountains which in some parts approach within a short distance of the coast. The south coast of the peninsula from Gibraltar to Cape Palos is mostly elevated and rocky: thence a coast, low and sandy, or else rocky, extends as far north as Cabo Santa Pola—a short distance south of the town of Alicante—and on to the delta of the Ebro, which is the principal river in the eastern part of Spain. From the Ebro to the boundary of France the coast is for some miles alternately high and low.

Chart 2158a, Mediterranean sea, western sheet.

The following provinces are on the South and South-east coasts:—Cadiz, Malaga, Granada, Almeria, Murcia, Alicante, Valencia, Castellon, Tarragona, Barcelona, and Gerona.

Rivers.—Spain is drained by many rivers, some of considerable length, but only a few are navigable; and those in the Mediterranean, principally near their mouths, for small boats. These are generally shallow owing to the small amount of rainfall, which is soon evaporated, as the highest parts of the interior are destitute of trees; and a large quantity of the water is used for irrigating the land.

Among the rivers which fall into the Mediterranean are, commencing in order from the south, the Segura, the Jucar, the Turia or Guadalaviar, and the Ebro. These are of little service for inland communication, but are of great value for the purposes of irrigation, and the Segura and Jucar are useful for floating down timber.

The Segura, rising in the mountain of the same name, in the province of Jaen, has a tortuous course of 129 miles, but is a shallow stream, and at times the bar is almost dry, it enters the sea near the town of Guardamar.

The Jucar, having a course of 222 miles, is somewhat deeper, as it will admit small coasters over its bar; it rises on the confines of Aragon and New Castile, and flows into the sea at Cullera.

The Turia or Guadalaviar flows more than 20 miles through the plain of Valencia, which it abundantly irrigates, and thence into the sea near the Graó of Valencia; its whole course is 150 miles.

The Ebro, the largest river of the peninsula, rises in the vicinity of Reynosa, in the province of Santander, and after a course of 370 miles discharges by several mouths at Cape Tortosa; in its course it receives 150 tributary streams, and has the towns of Zaragoza and Tortosa on its right and left banks respectively.

About 20 miles below the latter town it divides and enters the sea by two mouths, forming between them the island of Buda. It is navigable for steamers of light draught as far as Mequinenza, and for boats as far as Tudela.

Lakes.—The only considerable lakes are Lago de la Janda in Cadiz, north-east of Cape Trafalgar, Mar Menor in Murcia, and Albufera de Valencia.

Geology.—The fundamental platform of the Spanish peninsula is composed of ancient crystalline rocks, previously upraised into detached ridges, and upon this a series of sedimentary formations are laid down. Deposits of tertiary age cover more than one-third of Spain, and the marine tertiary strata are developed in the basin of the Ebro, and in a belt which extends from Cadiz through Andalucia and Murcia to Valencia. Trachyte, liparite, andesite and basalt occur in volcanic series in the south of Murcia and in Catalonia.

Chart 2158a, Mediterranean sea, western sheet.

Flora and fauna.—In the Mediterranean provinces the general aspect of the vegetation agrees closely with that of the lowlands of the Mediterranean region generally.

On the lower slopes of the mountains, and on all parts left uncultivated, the prevailing form of vegetation consists of a dense growth of shrubs, with thick leathery leaves, known to the Spanish as Monte bajo, and although resembling each other in external appearance, they belong botanically to a great variety of families. Oranges, lemons, pomegranates, dates, olives, almonds, and nuts grow luxuriantly.

The Spanish peninsula belongs to the Mediterranean sub-region of the Palæarctic region of the animal kingdom, a division which includes also the north of Africa. The principal fishes are the tunny, the sardine, and anchovy.

Minerals.—The mineral products of Spain are rich and various, and its most valuable mines are silver, quicksilver, lead, iron, copper, antimony, and rock salt. The principal metals found in the various provinces of the Mediterranean seaboard are as follows: Gold and silver in Almeria; quicksilver in Almeria, Castellon, Granada, and Murcia; lead in Almeria, Barcelona, Castellon, Granada, Malaga, Murcia, and Tarragona; iron in Almeria, Barcelona, Granada, Malaga, Murcia, and Tarragona; copper in Almeria, Barcelona, Granada, and Malaga; and rock salt in Alicante, Barcelona, Granada, and Murcia.

Population.—In 1910 the population of the several provinces of the Mediterranean seaboard was as follows: Cadiz, 465,220; Malaga, 497,888; Granada, 503,898; Almeria, 354,344; Murcia, 600,489; Alicante, 483,986; Valencia, 852,930; Castellon, 320,338; Tarragona, 335,500; Barcelona, 1,107,765; and Gerona, 315,894.

Products.—The country is generally fertile and well adapted to agriculture and the cultivation of oranges, olives, lemons, almonds, pomegranates, and dates.

Among the agricultural products are wine, grapes, oats, barley, wheat, maize, rice, oil, sugar, hemp, flax, esparto grass, cotton, saffron, barilla, honey, silk, with all kinds of European vegetables.

Harbours.—Considering that the extent of the south and south-east coasts of Spain is nearly 770 miles, it is singularly destitute of natural harbours, although there are many small coves in which coasters may take shelter during gales. Port Alfaques, the only natural harbour which will accommodate sea-going vessels, is situated near the delta of the Ebro, and formed by the alluvium discharged by that river; it is sheltered from all winds and has accommodation for a large number of vessels drawing less than 18 feet.

Artificial harbours have been constructed at Malaga, Almeria, Cartagena, Alicante, Port Gandia, Valencia, Viñaroz, Tarragona, and

Chart 2158a, Mediterranean sea, western sheet.

Barcelona. These harbours have been constructed at enormous cost, and all require constant dredging to remove the silt thrown in by easterly winds and by other causes.

Pilotage regulations.—At all Spanish ports comprised in this volume, foreign vessels of war are exempt from taking a pilot and shall not be required to pay unless they request one, whatever may be the regulations of the port.

Whenever possible, the position where they should anchor will be signalled to them beforehand.

Sanitary regulations at ports. — The Spanish coast is divided into sanitary districts, each of which contains at least one first-class and a number of second-class stations. At the latter no sanitary measures beyond the disinfection of clothes and baggage can be undertaken. Vessels requiring disinfection of hull and cargo and rat destruction must proceed to a first-class sanitary station, which exist at the following ports: Palma (Majorca), Port Mahon, Barcelona, Valencia, Cartagena, Malaga.

The regulations are administered with great strictness by the local officials of the Sanitary Department, who, on the slightest suspicion, classify arrivals under groups (*b*) or (*e*), which necessitates their being sent to a station of the first class. These groups refer: (*b*) To vessels with a clean bill of health which, for various reasons, must be considered as modified; and (*e*) to infected vessels classified as "suspicious" by reason of having had cholera, plague, or yellow fever on board on sailing from the port of departure or during the passage, but on which no fresh case occurred since the death or recovery of the last patient, nor during the last seven days of the voyage in the case of plague or cholera, and 18 days in the case of yellow fever. In order to escape being classified under either of these groups, the greatest care should be taken by the masters of vessels to afford the authorities every facility for inspection, &c., and to declare every case of illness which may have occurred during the voyage. It is especially necessary to declare cases of dysentery, which, if suppressed, are presupposed by the sanitary authorities to be cholera.

Communications.—Steamships.—In addition to local steamers, and which are in constant communication between the ports of Spain, the following are the principal lines affording steam communication:—

Compañia Transatlántica.—From Barcelona, monthly to Cadiz, Mogador, Malaga, and the Philippine islands; this is the most important company, having their head-quarters at Barcelona, and the steamers also run to Cuba, New York, and all parts of South America.

Compagnie Générale Transatlantique.—Weekly between Cartagena and Oran.

Chart 2158a, Mediterranean sea, western sheet.

Adria line.—From Gibraltar, call at Malaga every three weeks, thence to Marocco ports and Fiume.

Correos de Africa.—Cadiz to Tangier and Algeciras every day except Sundays; Algeciras to Tangier and Cadiz every day except Mondays.

Coriat Hermanos.—Irregular sailings from Malaga for African coast.

Steamers run four times a week between Barcelona and Palma and weekly from Barcelona, Alicante, and Valencia to the other Balearic islands.

Railways.—The railway from Algeciras joins the main line, from Malaga, at Bobadilla, from which, *viâ* Cordova, there is railway communication with Madrid, Seville, Cadiz, &c. From Malaga, in addition to the above, there is a branch line to Granada, *viâ* Bobadilla, and a line to Velez-Malaga and Coin.

From Almeria a line runs to Baza, a distance of 150 miles; and from Aguilas there is a short branch line to Almendricos from which, to the westward, a railway runs to Baza (69 miles), and to the eastward to Murcia; thence railway communication with Madrid, Cartagena, Alicante, &c.

Cartagena is in direct railway communication with Madrid (326 miles), *viâ* Murcia, Chinchilla, and Alcazar, and Alicante has also direct communication with Madrid, the distance being 283 miles; at Albatera-Catral, between Alicante and Murcia, there is a branch line to Torrevieja.

A line from Denia runs, for a distance of 41 miles, to Alberique, and there joins the main line to either Madrid or Valencia; there is a station at Gandia, 19 miles eastward of Denia, and at Silla, eastward of Alberique, a short branch line (16 miles) runs to Cullera. A line is being constructed from Denia to Villajoyosa and will afterwards be continued to Alicante.

Between Valencia and Tarragona the line runs near the coast, with stations at Sagunto, Castellon de la Plana, Viñaroz, Tortosa, and Cambrils; Valencia has railway communication with Madrid and Zaragoza, joining the line between these places at Calatayud, and there is also a line from Valencia to Madrid through Cuenca. A short line from Valencia runs to Liria.

From Tarragona the line skirts the coast so far as Vendrell, where there is a station; it then strikes inland to where there is a junction, one line running to Barcelona through the interior and another along the coast. There is a railway to Zaragoza through Lerida and also one through Hijar, both *viâ* Reus junction.

Barcelona has railway communication, through Mauresa and Lerida, with Zaragoza, and thence with the main lines of Spain. From Mauresa a line runs to the Berga mines. The line, running to

Chart 2158a, Mediterranean sea, western sheet.

the eastward, is generally near the coast, so far as Blanes, with stations at Badalona, Premia, Mataro, Arenys de Mar, and Calella, but at Blanes it turns inland to Empalme junction, between which and Barcelona there is another railway more inland. There is also a railway from Barcelona to Ripoll, which it is proposed to extend to Puigcerdá, and thus give direct communication with Bordeaux, and a line is being constructed from Barcelona to Mauresa through Martorell.

From Empalme the railway has a north-east direction to Portbou, and short lines from San Felix de Guixols and Palamos, join it at Gerona and Flassa junctions respectively. From Gerona a short line runs to Olot.

Telegraphs.—A submarine telegraph cable connects Tarifa and Tangier, and there is one between Estepona and Ceuta. There are two cables from Alicante to Iviza; one from Barcelona to Marseille, and one from Barcelona to Palma. Tarifa is connected with Ceuta by wireless telegraphy, and it is intended to connect the Balearic islands with each other, and with the mainland by the same system. A wireless station is installed near Barcelona.

Time.—Greenwich mean time is kept.

Money.—Measures.—Weights.—100 centimos = 1 peseta = $9\frac{6}{10}$d. specie, or about $7\frac{1}{2}$d. paper.

Gold coins.—25, 20, 10, and 5 pesetas.

Silver coins.—1 and 5 pesetas.

100 pesetas = £4. 0s. 10d. 10 pesetas = 7s. 11d.

Bronze coins are 10, 5, 2, and 1 centimo pieces.

Paper money is largely in use.

The measures and weights are the metro and chilometro for length; the litro for capacity; the gramo for weight; the area for surface, and the hectarea for land, the same as those for France.

Climate.—The climate of Spain is much diversified, for while it may be said of the interior that it is scorching and calcined in summer, keen cold and stormy in winter, the coast of the Mediterranean in its climate is tempered by the sea breeze in summer, while the rigours of winter are scarcely known, and several of its seaport towns are well-known winter resorts. Except in the north the climate of Spain is everywhere remarkable for dryness, and this dryness occasionally becomes so excessive that rivers of considerable size are dried up, and animals die from thirst.

The warmest part of the Spanish coast is that named La Marina, which may be considered to extend from Adra, on the west, to Cape Palos on the east.

Meteorological tables for Cartegena and Barcelona are given in Appendix III.

Chart 1187, Alicante to Palamos, with the Balearic islands.

BALEARIC ISLANDS.—The Balearic islands, consisting of Majorca, Minorca, Iviza, and Formentera, with their outlying islets, constitute a province of Spain under the name of Baleares. Iviza and Formentera were known to the ancient Greeks and Romans by the name of Pityusæ insulæ or Pine islands. They lie nearly in line with Capes de Gata and Palos in a north-easterly direction, extend over a space of 160 miles, have an area of 1,935 square miles, and include a coast line of about 440 miles; they are separated from the coast of Valencia and Catalonia by a channel varying between 50 and 100 miles in breadth.

Nothing is known certainly of the origin of the early inhabitants, but about 23 years after the destruction of Carthage, some 3,000 Roman and Spanish colonists settled on the islands, and in 423 A.D. they were taken possession of by the Vandals; in 798 by the Moors, and became a separate Moorish Kingdom in 1009, but the Moors were expelled in 1232, and they formed an independent kingdom to 1349, from which time their history merges in that of Spain.

Taken by Great Britain between 1707 and 1715; captured by the French in 1756; restored to Great Britain 1769; retaken by Spain 1782; seized by Great Britain in 1798; they were finally ceded to Spain in 1803.

Majorca and Iviza are elevated and mountainous, Minorca and Formentera are less so; the general features of the coast are high, steep, and rugged, fringed by rocks and islets, but affording some good anchorages, and the channels between the islands are deep, and navigable for all classes of vessels.

Rivers, or more properly torrents, are short and rapid.

Geology.—Minerals.—Majorca is of limestone formation, and has quarries of marble of various grains and colour, those of Santagny, near Manacor, being the most celebrated. Lead, iron, and cinnabar, are obtained, and coal, of a jet character, is found; there are eight lead mines in the islands.

In Minorca, stone, of various kinds, is plentiful, and a soft stone, easily quarried, but acquiring hardness from exposure, is much used for building purposes: lime and slate are abundant, and, in some of the mountain districts, marbles and porphyries, superior to those of Italy, have been found. Scarcity of fuel prevents lead, copper, and iron being worked.

Fauna.—Hares, partridges, quail, and snipe are abundant, and the sea swarms with fish of various kinds.

Population.—In 1910 the population of the Balearic islands was 325,703. The inhabitants of Majorca are said to bear a striking resemblance, in appearance and general character, to the Catalans.

Products.—Agriculture is the principal industry of the inhabitants of Majorca, and most of the arable land is under cultivation;

Chart 1187, Alicante to Palamos, with the Balearic islands.

the soil in the mountain districts, although stony, is rich, but in the plains it is less so. The old pine wood has given way to the olive, the vine, and the almond tree, to fields of wheat or flax, or orchards of figs and oranges; the oil harvest is considerable; the wines light, but excellent; and sheep, mules, and asses, are reared in great numbers.

In Minorca the higher districts are also fertile, but the plains chalky, and unfit for the plough; there is an excellent breed of cattle, which, with the production of cheese, constitutes the principal branch of agriculture of the island. Hedysarum coronarium, or Zulla of the Spaniards, is largely cultivated for fodder; wine, oil, potatoes, legumes, hemp, and flax are produced in moderate quantities, the sweet potato is grown, and caper plants climb on ruined walls. There are quantities of fruits of all kinds, and melons, pomegranates, figs, and almonds are abundant.

Iviza is probably the most fruitful of the islands, and produces oil, corn, hemp, and flax, and of fruit the most important are the almond, the common fig, prickly pear, and carob bean; it has also numerous salt pans along its coast.

Trade.—The exports from the islands are chiefly apricot pulp, almonds, oil, boots and shoes, locust beans, pigs, oxen, sheep, mules, cotton stuffs, and cheese; and imports coals, skins and hides, leather, cotton and woollen goods, ironware, petroleum, machinery, &c.

Ports.—Palma, the capital of the islands, is the most important port of Majorca, the other principal harbours are Port Soller, Pollensa and Alcudia bays; Port Mahon, on the east side of Minorca, is spacious; on the north is Port Fornells, and on the west Port Ciudadela. Port Iviza is the principal harbour of the island of the same name.

Pilotage and **Sanitary regulations,** *see* page 9.

Communications.—Steamships.—There is communication four times a week by the steamers of the Istena Maritima Compania, between Barcelona and Palma: weekly between Barcelona, Mahon, Alcudia, and Port Soller, also weekly, by the same steamers, between Alicante, Iviza, and Palma, and between Valencia, Iviza, and Palma, thus giving weekly communication between the islands. Steamers of a French company run between Marseille, Palma, and Algiers.

Railways.—Majorca is the only one of the islands having railway communication, the main line being from Palma to Manacor, with short branches to Felanitx, La Puebla, and Soller.

Telegraph.—Two submarine cables connect Iviza with Alicante: there is a single cable between Iviza and Majorca, and a single cable

Chart 1187, Alicante to Palamos, with the Balearic islands.

between Majorca and Minorca. A cable connects Palma with Barcelona. A wireless station is installed at Port Soller.

Roads.—In Majorca there are excellent roads from Palma to Manacor, Alcudia, Port Soller, and Andraitx, and in Minorca, between Port Mahon and Ciudadela; the by-roads are rugged, and traversed only by mules, which, with rough carts, form the ordinary mode of conveyance.

Climate.—The climate of Majorca is remarkably mild and pleasant, the heat of summer being tempered by sea breezes. At Palma the mean maximum temperature for the year is 72° Fah., and mean minimum 56°. Cold and strong northerly winds are of rare occurrence.

Minorca is exposed in autumn and winter to the violence of northerly winds, and, owing to the want of shelter from mountains, the climate is not so equable as that of Majorca. The springs are mild, with moist atmosphere; the summer heat oppressive; the autumn remarkable for frequent and heavy rains, and the winter damp and raw.

The climate of Iviza is in most respects similar to that of Valencia and Catalonia; the winters are mild, and the summer heat tempered by sea breezes.

Meteorological tables for Palma and Port Mahon are given in Appendix III.

Chart 2717, Gibraltar to Alicante, &c.

MAROCCO.—The coast of Africa, forming the southern boundary of the Strait of Gibraltar, is part of the State of Marocco (Moghrib-el-Aksa, ancient Mauritania), one of the largest of the Barbary states. The general surface of the country is mountainous with many rich plains and fertile valleys; at 3 to 10 miles inland the mountains attain an elevation of from 3,000 to 7,000 feet above the level of the sea.

From Cape Spartel to the Wadi Skiss or Ajerud, the boundary between Marocco and Algeria, it has a coast line of about 250 miles, but there are Spanish possessions at Ceuta, distant 33 miles from Cape Spartel, and also at Alhucemas, Melilla, Peñon de Velez, and the Zafarin islands.

The Wadi Maluya, the ancient Malucha or Malva, which has a course of about 400 miles, is the largest river on the north coast of Marocco.

Products.—Eggs are the principal products of this part of the coast, the other products are almonds, dates, oranges, and linseed, but only in small quantities; large numbers of oxen are shipped, principally to Gibraltar and Malta.

Trade.—The chief exports at Tangier and Tetuan, consisting of oxen, slippers, eggs, goat skins, and ox hides, in 1910, were valued at

Chart 717, Gibraltar to Alicante, &c.

£264,725; and the imports of cotton and woollen goods, sugar, raw silk and silk goods, tobacco, wines and spirits, and hardware at £420,552, this being exclusive of specie.

Ports.—The principal ports are Tangier and Tetuan. Considerable works are projected at Ceuta.

Communications.—Steamships.—The following steamship companies afford communication on this coast:—

Ellerman line (formerly Papayani Company).—Liverpool to Egypt fortnightly (irregular).

Royal Mail Steam Packet Company.—From London, viâ Gibraltar, fortnightly.

Power Steamship Company.—From London, viâ Gibraltar, about twice monthly.

Bland & Co. and Messrs. Mateos & Sons.—From Gibraltar, three times a week.

Compagnie de Navigation Mixte.—From Marseille to Algeria, Gibraltar, Tetuan, and Tangier weekly.

N. Paquet and Cie.—From Marseille, with Marocco ports and Canary islands, fortnightly.

Compagnie Générale Transatlantique.—From St. Nazaire to Tangier, monthly.

Sòciété Orano-Marocaine.—From Oran, calling at Tangier, fortnightly.

Deutsche Ost-Africa call at Tangier on their passages to and from East African ports, fortnightly, calling at Lisbon and Dover on homeward voyage.

Oldenburg Portugiesische Steamship Company.—Regular sailings from Hamburg and back.

Nederland Royal Mail, from Amsterdam, monthly; and Rotterdamsche Lloyd, from Rotterdam, fortnightly.

Servizio Italo-Spagnuolo.—From Genoa, viâ Barcelona and Malaga, monthly.

Adria Company from Fiume, monthly.

Correos de Africa.—Cadiz to Tangier and Algeciras every day except Sundays; Algeciras to Tangier and Cadiz every day except Mondays.

Coriat Hermanos.—Irregular sailings from Malaga.

Compañia Transatlantica Española.—Regular monthly sailings from Barcelona.

There is also communication with Constantinople, Antwerp, and South America.

Tangier has daily communication with Gibraltar, by Spanish mail steamers.

Telegraph.—Submarine cables connect Tangier with Tarifa and

Chart 2717, Gibraltar to Alicante, &c.

Gibraltar, and there are single cables connecting Ceuta, Velez de la Gomera, Alhucemas, Melilla, and the Zafarin islands. Melilla is also connected by a single cable with Almeria.

There is a wireless station at Tangier.

Landing.—On the north coast of Marocco, landing is only permitted at Tangier and Tetuan; foreigners are not permitted to land elsewhere, and vessels anchoring at other places in Marocco have been fired at.

Money.—Measures.—Weights.—Spanish currency: 100 centimos = 1 peseta; 25 pesetas (at par) = £1. Moorish currency: 3 filss = 1 moozonat; 4 moozonat = 1 ukiya (oz.); 10 ozs. = 1 metkal (ducat); 12½ metkals = 1 hassani dol. (silver); 5 hassani dol. (at par) = £1.

There are three weights in use generally: (1) The British avoirdupois is used for selling biscuits, confectionery, starch, and similar European commodities.

(2) The attari or grocers' weight for sugar, tea, and rice. In this the kantar equals the British cwt., and the lb. the one-hundredth part of it. 16ozs. = 1lb. (1lb. 2ozs. British): 25lbs. = 1 robo or quartern; 100lbs. = 1 kantar or quintal.

(3) The bakalli or oilman's weight is as follows: 16ozs. = 1lb. 11ozs. (avoir.); 25lbs. = 42lbs. 3ozs. (avoir.); 100lbs. (kantar bakalli) = 168lbs. 12ozs. (avoir.). The bakalli measure is used for meat, vegetables, fruit, salt, butter, &c.

The grain measure varies in different places to such an extent as to make a brief table not feasible.

In Tangier the British yard measure is largely used. The native measure is the kala or cubit = 21¾ inches, and is also used for selling cloth of European make. The kala is divided into 16 parts called nuss-tmin. Native-made cloths are sold by the dra = 18 inches.

The kala is roughly the length of a man's arm from elbow to finger tip, plus the length of the middle finger. The dra is supposed to be the length of a man's arm from the elbow to the tip of the middle finger.

The metric system is coming more and more into general use, and is now very commonly employed by Europeans in Tangier.

Climate.—The climate is generally mild and agreeable, at Tangier the thermometer ranges, in winter, from 50° to 64° Fahr. in the daytime, and seldom rises above 78° in summer. The air is frequently moist with sea damp, and is not suitable to rheumatic affections.

Chart 2158a, Mediterranean sea, western sheet.

ALGERIA.—An important colony of France, named by them Algérie, extending eastward from the Wadi Skiss to Cap Roux, embraces a coast line of 710 miles and has an estimated area of 150,500 square miles; it is generally mountainous, being traversed by

Chart 2158a, Mediterranean sea, western sheet.

lofty ranges of the Atlas system, and has extensive tablelands, elevated valleys, and a number of large plains, near the coast, which is in general bold and rocky, and has several deep bays, and the few small islands and other detached features are but a short distance off.

The land rises from the shore to heights of from 1,000 to 3,000 feet, and the greatest elevation within 10 miles is Jebel Tababor, 6,460 feet above the level of the sea.

Originally inhabited by two nations, the Massyli and Massœsyle, it was afterwards in the hands of the Romans, Vandals, Saracens, and Morabites (a numerous sect of religionists) till, in 1509 it passed to Spain, but in 1516 it was held by Aruch Barbarossa, the famous Turkish pirate, who introduced the system of piracy, for which Algeria was noted, down to 1830, when a large expedition from France took possession of the country.

It is divided into three provinces, viz., Oran, Algiers, and Constantine, the whole under a Governor-General assisted by a Consultative Council.

Rivers.—The rivers are numerous, but the majority have short courses, rising mostly in the mountains near the coast and are much swollen during rains.

Wadi Shelif, the most important, rises on the northern slope of Jebel Amur, flows first in a northerly direction, then west, with several tributaries, and after a course of 370 miles enters the sea 6 miles north-east of Mostaghanem. The Wadi Sommam, rising in the interior of the province of Algeria, has a general north-east course, and flows into the sea near Bougie.

The Wadi Seibus, formed by the union of several streams in the interior of the province of Constantine, has a course of 120 miles and enters the sea at Bona.

Algeria abounds in lakes and marshes, the largest of the former being Fetzara near Bona.

Geology.—A line running east and west divides the country into two zones; that to the northward is known as the Tell, and that to the southward as the Sahara. The Tell is composed of crystalline rocks, schists, and lias; the Sahara consists of wide sandy or rocky plains without any noteworthy features.

Minerals.—The mineral wealth is great, the principal being iron, copper, lead, mercury, and antimony. There are also immense quantities of salt.

Flora and fauna.—There are large forests of trees which frequently attain gigantic sizes; they are principally elm, ash, maple, olive, oak, pine, cedar, &c., and the cork tree is very common; the forests cover 7,410,000 acres.

Lions, formerly plentiful, are now extremely rare, but leopards,

Chart 2158a, Mediterranean sea, western sheet.

panthers, jackals, and hyænas are common, and monkeys and apes numerous; the wild boar frequents the oak forests, the brown bear is found in the higher parts of the country, there are various species of antelopes, and one of the most important animals is the camel.

Eagles, vultures, hawks, and owls are common; snipe, plover, storks, curlew, and herons frequent the marshes, and the ostrich has its habitat in the desert. Tortoises, turtles, lizards, and various species of snakes are found, and locusts frequently do considerable damage to crops.

Every species of fish found in the Mediterranean is caught off the coast, including the tunny, the sardine, the sole, and the mullet, as well as shell fish in great variety.

Population.—In 1910 the total population numbered 5,158,051, of whom 514,066 were French, natural born or naturalised, and 4,447,149 were non-Europeans.

Products.—Wine is the largest industry in Algeria, large quantities of cereals are grown, and the area of alfa fibre, or esparto grass, is estimated at more than 12,000,000 acres. Olive oil, cork, fruits, and vegetables are largely exported, and sheep, principally sent to France, is a very important industry, and one of the few in which the Arab is engaged. Two separate belts of phosphates, constituting a large reserve of natural manure, have been discovered. Iron ore, zinc, lead, and copper are all worked.

Trade. — The value of the exports in 1910 amounted to £20,513,000; wine amounting to £7,894,200. The value of the imports in the same year amounted to £20,479,000, of which the principal were cotton textiles, coal, leather goods, metal wares, clothing, machinery, and motor cars.

Shipping. — During the year 1909-1910, the total number of vessels entered at the various ports of Algeria was 5,003, having a total tonnage of 5,691,063; of this, the port of Algiers took nearly 50 per cent.

Ports.—There are no natural harbours and few good anchorages, but artificial ports at Oran, Tenez, Algiers, Philippeville, and Bona give considerable accommodation.

Communications. — Steamships. — The steamers of the Cie. Gen. Transatlantique, from Marseille, call at the ports of Algeria as follows: Four times each week at Algiers; twice weekly at Bona, Bougie, Oran, and Philippeville; and once every week at Bizerta, Calle, Jijelli, and Port de la Calle. There is also a weekly service of these steamers, between Bona, Ajaccio, and Porto Torres, in Corsica.

The Compagnie de Navigation Mixte have weekly sailings from Marseille for Oran, Philippeville, Algiers, and Bizerta, and alternatively

Chart 2158a, Mediterranean sea, western sheet.

each fortnight to Nemours, Beni-Saf, or to Arzeu and Mostaganem. The Societé Generale de Transports Maritimes have a weekly service between Marseille and Algiers. The Adria line between Fiume and the Marocco ports, *viâ* Malaga and Gibraltar, call, every fortnight or three weeks, at Oran and Algiers.

The other lines that call are: Compagnie Havraise Peninsulaire, from Havre to Oran and Algiers; Compagnie des Bateaux á Vapeur de Nord, from Antwerp and Dunkerque to Algerian ports and Tunis; Compagnie Mediterranéene de Navigation, from Marseille to Cette and Algiers; Conseil Freres, from Bordeaux to Valencia, Alicante, and Algerian ports; Vapeur de Charge Francais, from Marseille to Algiers, Oran, Rouen, and Dunkerque; Compagnie des Affreteurs Réunis and Société Navale de l'Ouest, from Rouen to Algiers; Chevilotte Freres, from Brest to Nantes, Bordeaux, Oran, and Algiers; Delmas Freres, from La Rochelle to Bordeaux, Oran, Algiers, and Tunis; Norddeutscher Lloyd, from New York to Algiers, Genoa, and Naples, and from Bremen to Southampton, Gibraltar, Genoa, and Yokohama, calling at Algiers for passengers only; Deutsche Levant Linie, from Hamburg to Algiers, Malta, Alexandria, and Odessa; the Wilson and Moss lines, from English ports to Algiers; A de Freitas, from Hamburg to Newcastle, Algiers, and Trieste; Austro Americana, from New York to Algiers and Trieste; Italo-Spagnuolo Line, from Genoa to Italian ports, Algiers, Spanish ports, and Oran; Islemo Maritima Line, from Barcelona to Palma and Algiers; Sitges-Hermanos, from Alicante to Algiers (small steamer).

Railways. — The West Algerian railway runs from Oran to the westward, for a distance of 48 miles, to Aïn Temouchent, and Oran is in communication with Algiers by the Algiers and Oran railway, with, at Ste. Barbe du Tielat, a branch to Tabia (46½ miles) from which two short branches run to Tlemcen and Ras el Mar.

Arzeu is connected by a short line, with the Algiers and Oran railway to Perregaux; thence a branch runs to the southward to Aïn Sefra. There is a line from Aïn Sefra to Colomb-Bechen on the southern Oran railway and one from Tlemcen to Turenne on the Moroccon frontier. Lines from Berrouaghia to Jelfa, and also from Beni-Saf to Tlemcen are under construction.

Mostaghanem is connected with the Algiers and Oran railway at Relizane, from which a short branch runs south-eastward to Tiaret; and there is another short branch from Blidah to Berrouaghia.

From Algiers to Khroub is the main line of the East Algerian railway, which approaches the coast to the eastward, so far as Menerville where there is a branch line (33 miles) to Tizi-ouzou.

Bougie is connected with the East Algerian railway at Beni Mancour (55 miles), and at El Guerrah, a branch to the southward runs to Biskra (125½ miles).

Chart 2158a, Mediterranean sea, western sheet.

Philippeville is connected *viâ* Constantine with the East Algerian railway at Khroub.

The Bona and Guelma railway runs between Bona and Khroub (126 miles), and also to Tunis *viâ* Duvivier junction, and has a branch line to the southward from Souk-Ahras to Tebessa; Bona and La Calle are connected by a line 56 miles in length. In 1910 there were 2,032 miles of railway in Algeria.

Telegraphs.—Oran is connected by single submarine cables with Gibraltar and Marseille; Algiers has three cables connecting it with Marseille; there are two cables from Marseille to Bona, and from Bona two cables to Malta and two to Bizerta. There is a wireless station at Fort de l'Eau, near Algiers.

SUBMARINE VESSELS.—Signals.—Regulations.—A square flag with one yellow and one red horizontal stripe, the red being the upper, hoisted at any of the signal stations on the coasts of Algeria and Tunis, indicates that French submarine vessels are exercising submerged in the vicinity.

Submarines on the surface conform with the ordinary Rule of the Road, but when submerged all vessels are to keep out of their way.

When any vessel finds herself in the neighbourhood of a submerged submarine, the captain or master of the vessel is obliged to see placed, in the bows of his vessel or on each side of the navigating bridge, a look-out man to attentively watch the surface of the water and report anything he may see; the periscope of a submarine looks like a round staff coming up vertically out of the water.

A steam boat or a torpedo boat escorting a submarine vessel submerged, carries at the stern, instead of the national flag, a white ball, and at the bow the yellow and red flag described above.

Every vessel seeing the above-mentioned signals should steer so as to give a wide berth to the escorting vessel, and to pass astern of her.

Whilst engaged in exercises, whether in harbour or at sea, submarine vessels carry at the stern the national flag, and at the bow the yellow and red flag described above.

Every vessel seeing these signals should keep out of the way of the submarine vessel, which, although temporarily navigating on the surface, should be considered as still engaged in manœuvres.

When submerged submarines are engaged at torpedo exercises against a floating target, the following signals will be made:—

(1) During the exercise the tender will fly a red flag, and a large flag with a yellow and red horizontal stripe will be hoisted in a conspicuous clear space. No vessel must pass within half a mile of the tender.

(2) Should the tender see a vessel approaching dangerously near, she will hoist the signal M N, and, if necessary, fire a gun. The signal M H will indicate that danger is over, and the vessel can proceed.

No vessel or boat of any description is permitted to go alongside a submarine vessel without special permission.

Chart 2158a, Mediterranean sea, western sheet.

Lights. — French submarine vessels, when in commercial ports, will show at night, in addition to the usual *white* anchor light at each end of the vessel, two *red* lights over a *white* light, placed vertically 6 feet apart.

Fairways reserved for traffic. — CAUTION. — When submarine vessels are exercising at Bona, Philippeville, Bougie, Algiers, Mostaghanem, Arzeu, or Oran approaches, a fairway is reserved for traffic and vessels are **earnestly requested** to make use of these fairways.

The fairways are described, later on, with the various places.

Vessels inconvenienced by searchlights.—For signals, *see* page 65.

Time.—Greenwich mean time is kept.

Money.—Measures.—Weights.—The currency, measures, and weights are the same as those of France; there are in circulation bank notes for 50 and 100 francs.

Earthquakes. — Algeria is subject to earthquakes, which frequently occur, and are occasionally very severe. One, in the year 1716, continued with intervals for a month; Blidah was entirely destroyed by one, and again in 1867 it, and surrounding villages, were partially thrown down. An earthquake destroyed the town of Jijelli in 1855; and a very severe one occurred at M'Sila in 1885.

Climate.—From its position, Algeria might be supposed to enjoy a warm climate, but the temperature varies considerably in different parts, according to the elevation or configuration of the country, it is, however, generally healthy except in the vicinity of marshes. The northern districts much resemble Spain as regards climate, but in the Sahara the heat is often excessive; on the coast the temperature is mild, rarely sinking to freezing point even in winter.

Meteorological tables for Oran and Algiers are given in Appendix III.

TUNIS, formerly a beylik of the Turkish empire, but now a French protectorate, is bounded on the west by Algeria; on the north by the western basin of the Mediterranean; on the east from Cap Bon to the Gulf of Gabes by the eastern basin of the same sea, and on the south-east by the province of Tripoli; on the south the boundary is the Sahara, and the frontier line is indefinite. Its greatest breadth, east and west, is about 150 miles, and its length, north and south, about 300 miles.

It is formed by the prolongation, towards the east, of the two great mountain chains of Algeria, and is a picturesque, fertile, well-watered region; its coast line, including the islands, is 759 miles in length, and is deeply indented, forming on the north, the gulf of Tunis and on the east the Gulfs of Hammamet and Gabes. The extensive peninsula, which terminates at Cap Bon, and separates the two former gulfs, is distant 77 miles from the south-west extreme of Sicily.

Chart 2158a, Mediterranean sea, western sheet.

Tunis was annexed to the Turkish empire in 1574 and was one of the Barbary states of North Africa, but since 1881, it has been a dependency of France, whose Resident General exercises all real authority in the nominal dominions of the Bey.

Rivers.—Lakes.—Wadi Mejerda, the principal river, and the most important in North Africa has a course of 300 miles, and flows into the sea near Cap Farina; there are several streams and lakes of considerable size, beside salt lagoons, the two largest lakes are those of Bizerta and Tunis, having respectively circumferences of 30 and 20 miles.

Flora and fauna.—Flora and fauna are both generally the same as those of Algeria.

The African moufflon still exists in the southern mountains, and herds of buffaloes are found in the district of Mater; wild boars, partridges, carthage fowls, quails, and snipe may be shot.

Of noxious creatures may be named the scorpion (more common than in Algeria); a venomous tree snake (Echis carinata) found on sandy lands between Kasfa and Sfax, and a species of python, named taguerga, in the southern mountains.

Population.—In 1908 the population was estimated to number about 1,800,000, including 129,500 Europeans.

Products.—The productions of the country are grain of various kinds, cattle and sheep, olives, dates, and other fruit, oil, wool, silk, and cotton, soap, leather, &c. The minerals which are worked are lead, zinc, and iron ore, of the latter 332,000 tons were exported in 1910. The country is rich in phosphates.

There are considerable manufactures of silk and woollen stuffs, shawls, carpets, mantles, fez caps, bernouses, also of otto of roses and jessamin.

Trade.—The chief exports, consisting of phosphates, grain, mineral ores, oil, wine, hides, esparto grass, and cattle, in 1910, were valued at £4,816,043; and the imports of hardware, machinery, flour, wrought iron and steel, wheat and grain, cotton goods, sugar, coal, carriages and timber were valued at £4,219,892.

Shipping.—In 1910 the number of steam vessels that entered Tunisian ports was 3,966, having a total tonnage of 3,994,695 tons, and that of sailing vessels 8,330, with a total tonnage of 156,177 tons.

Ports.—The chief ports are Bizerta, Tunis (the capital), and La Goletta on the north, Susa, Hammamet, Sfax, Gabes, and Monastir on the east.

SUBMARINE VESSELS.—Signals.—Regulations.—Lights.—*See* page 20.

Chart 2158a, Mediterranean sea, western sheet.

Fairways reserved for traffic. — CAUTION. — When submarine vessels are exercising at Bizerta, Tunis, or Susa approaches, a fairway is reserved for traffic, and vessels are **earnestly requested** to make use of these fairways.

The fairways are described, later on, with the various places.

Vessels inconvenienced by searchlights.—For signals, *see* page 65.

Communications. — Steamships. — Tunis has steamship communication by the following lines: —

The Prince line runs a regular service from Manchester to Tunis three times a month, and a less frequent service from London or Antwerp.

Navigazione Generale Italiana.—Weekly from Tunis to Naples, Bizerta, and Genoa, calling at Cagliari; to Pantellaria, Marsala, and Trapani, and to Susa, Monastir, Mahedia, Sfax, Gabes, Jerba, and Tripoli.

The Compagnie Générale Transatlantique.—Weekly to Malta; to Marseille, calling at Bizerta and Tabarka, and to Sfax and Susa.

The Compagnie de Navigation Mixte.—Twice every week to Algiers, and weekly to Susa, Monastir, Mahedia, Sfax, Gabes, Jerba, Philippeville and Bona; and alternately, every fortnight to Beni Saf, Nemours, Melilla, Tetuan, Gibraltar, and Tangier; or to Arzeu, Mostaghanem, Nemours, Melilla, and Malaga.

The Compagnie des Bateâux à Vapeur du Nord leave Tunis three times every month for Algiers, Oran, and Dunkerque, and once a month for Naples, Palermo, and Antwerp.

The Adria line.—Fortnightly between Tunis, Algiers, and Oran.

See also Communications, Algeria, page 18.

Railways. — Tunis is connected with the East Algerian railway through Souk-el-Arba. There is railway communication between Tunis and Bizerta; Tunis and the Gulf of Hammamet as far as Susa; and Tunis and Kalaat-es-Senam, with several short branches from it. A line from Tunis to Kelibia is being constructed.

From Susa a line runs inland as far as Sheitla, and is to be continued to Metlaoui, from whence a line runs to Sfax.

Telegraphs.—From Bizerta there are submarine cables to Bona, La Calle, and Tunis; there is a cable from Susa to Sfax; from Sfax a cable is laid to Jerba and thence to the African coast, and there is a cable between Jerba and Gabes.

Time.—Mid-European mean time or one hour fast of Greenwich mean time is adopted.

Money. — Measures. — Weights. — In 1891 a monetary system of francs and centimes and of gold, silver, and bronze coins, based upon, and identical with, the French currency, was adopted by the Government of Tunis.

Chart 2158a, Mediterranean sea, western sheet.

The gold coins are 20 and 10 francs; the silver coins 2 francs, 1 franc, and 50 centimes; and the bronze coins 10, 5, 2 centimes and 1 centime.

British goods are sold by the dra-arabi, or about 19·1 inches; and Turkish silks and drapery by the dra-turki, from 25 to 27 inches.

Wine is measured by the metar or 2·16 British Imperial gallons, and oil and other liquids by a metar of larger capacity, equal to 4·437 British Imperial gallons.

There are three kinds of rottolo or pound, viz., the rottolo-altari for metals, equal to 1·12lbs. av., divided into 16 ukie or ounces; the rottolo-sucki, equal to 1·17lbs. for butcher meat, fruit, olives, wood, coal, butter, honey, and soap; and the rottolo-khaddari, or greengrocers' weight, divided into 20 ukie, and equal to 1·42lbs.

Fisheries. — There is a large tunny fishery in the Gulf of Tunis and another near Monastir. The lagoons produce an abundance of mullet, eels, and prawns of large size.

Around the shores are fisheries of coral and sponge, the former chiefly on the banks adjacent to Galita island, the latter on the shallow off the islands of Kerkenah and Jerba.

Coral is procured at a distance of from 2 to 10 miles from the coast, and in depths of from 20 to 40 fathoms, the rocks from which it is taken lying upon a muddy bottom, and never upon sand. The fishery is chiefly carried on by Italians, residing on the coasts of Algeria and Tunis: the season is from March to October, but the fishery is continued throughout the year, when practicable, by those who reside on the adjacent coast. Sponges are collected from the rocks on the shallows around the islands, the season for procuring them being from December to February; the fishermen comprise Greeks, Italians, and Arabs, the former being most expert divers. In the same locality the polypi, Octopodia, are procured in large quantities and cured for the Greek markets.

Earthquakes. — Some earthquake shocks were experienced at Bizerta in February, 1899, and although doing no damage, were somewhat severe.

Climate. — A rainy season, lasting about three months, usually commences in December; the spring season of verdure is over in May and summer ends in October with the first rains.

Meteorological tables for Bizerta, Tunis, and Susa are given in Appendix III.

Chart 194, Malta and Gozo islands.

MALTESE ISLANDS. — This group, consisting of three islands, Malta, Gozo, and Comino, lies on the submarine ridge which separates the Eastern from the Western basin of the Mediterranean, at about 58 miles from Sicily, and 180 miles from the African coast,

Chart 194, Malta and Gozo islands.

The islands extend 24 miles in a north-westerly and south-easterly direction, and cover an area of 115 square miles.

The group was originally under the dominion of the Carthaginians, from whom they were taken in the first Punic war by the Romans; on the decline of the Roman empire Malta fell to the Goths, and then to the Saracens. It was subject to the crown of Sicily from 1190 to 1525, when the Emperor Charles V. granted it to the order of the knights of St. John of Jerusalem, by whom it was held for more than two centuries.

On the 12th July, 1798, Malta capitulated to Napoleon Bonaparte. It was taken possession of by Great Britain on the 5th September, 1800, and finally annexed to the British crown by the treaty of Paris in 1814.

Occupying a central position in the Mediterranean, and being in the direct route to the Levant and to India and Australia, *viâ* the Suez Canal, these islands are a most important port of call for the many vessels passing.

The government is administered by a Governor, usually a distinguished General, assisted by an executive and a legislative council, the latter known as the Council of Government.

Geology. — The geological formation is of the late Iocene, the prevailing rocks being white, grey, reddish, or yellow sandstone, with some beds of marl and coral limestone, in many parts abounding in fossils.

Flora and fauna. — The interesting flora of the islands approaches that of Africa, and includes the palm, the cactus, and other sub-tropical plants. The Botanic garden, founded in 1676, and the third oldest in the British Empire, is annexed to the University; there is also a model farm.

The scanty fauna is, for the most part, European; a few Maltese dogs still remain, but not in a wild state.

There are some 10 or 12 indigenous species of birds, and a large number of migratory birds pass, or rest, on, the island; the marine plants and animals are interesting.

Population.—The civil population of the islands in April, 1911, was 211,473.

Products.—The chief products are cotton, corn, oranges, melons, grapes, cumin seed, and early potatoes for the London market; figs and honey are plentiful.

The greater part of the soil was originally brought from Sicily; the acreage under crop, or on which fruit trees are grown, is estimated at 38,545 acres, or rather more than half the extent of the island. The lace industry affords employment to between 4,000 and 5,000 women and children, chiefly in Gozo.

Chart 194, Malta and Gozo islands.

Trade.—The chief exports are potatoes, onions, cumin seed, vegetables, oranges, cotton goods of local manufacture, Maltese canes, goats, and freestone, and the total value of goods exported (exclusive of transhipment) was in 1910 £863,429.

The total value of goods imported (exclusive of goods imported for transhipment) was in 1910 £2,356,043.

Shipping. — In 1910 the number of steam vessels entered was 2,277, having a total tonnage of 3,718,292 tons, and that of sailing vessels 715, with an aggregate tonnage of 36,803 tons.

Ports. — The Grand harbour is the principal port of Malta, and Marsa Musciet is known as the Quarantine harbour; there are also several bays and well-sheltered harbours round the islands.

SUBMARINE VESSELS. — CAUTION. — Submarine vessels are being constantly exercised in the vicinity of Malta.

In order to minimise the risk of collision with other vessels, the vessel escorting the submarines will, when the latter are exercising, display a large red flag at the masthead.

Every vessel seeing this signal should steer, so as to give the escorting vessel a berth of at least one mile, and also to pass astern of her; when from any cause this cannot be done, the escorting vessel should be approached at a slow speed until warning is given by flags, semaphore, or megaphone, as most convenient, of the danger zone, a good look-out being kept meanwhile for the submarines, whose presence may only be indicated by their periscopes showing above water.

Signal.—When submarine vessels are under way in the harbour, or within a mile of the entrance letter S. flag is hoisted at the Castille, Palace tower, and Custom-house (*see* page 492).

Communications. — Steamships. — The following are the principal steamship companies whose vessels call at Malta: —

Peninsular and Oriental.—To Gibraltar and London or to Port Said, fortnightly.

Moss line.—To Gibraltar and Liverpool or to Alexandria, fortnightly; and to Constantinople and the Black Sea ports, monthly.

Adria line.—To Syracuse daily (Mondays excepted); to Italian ports and Fiume, weekly; to Italian, French, and Spanish ports, weekly.

Navigazione Générale Italiana.—To Sicilian ports, Naples and Genoa, weekly; to Tripoli and ports of Tunis, weekly; and to Tripoli and its ports, weekly.

Compagnie Général Transatlantique. — To Tunis and Marseille, weekly.

Hamburg-American line.—To the United States.

Ligne Hambourgeoise du Levant.—To Hamburg, Havre, Pireus, Smyrna, and Constantinople.

Chart 194, Malta and Gozo islands.

There is also steamship communication with Gozo, two services daily each way.

Railway. — There is a railway from Valletta to Notabile, a distance of 8 miles.

Telegraph.—Three submarine cables connect Malta to Gibraltar, two to Bona, one to Tripoli, one to Sicily, one to Zante, and three to Alexandria; there is consequently telegraphic communication with all parts.

The inland telegraph system belongs to the Military authorities, and there is a military telephone to Gozo.

Time. — Mid-European mean time, or one hour fast of Greenwich mean time, is kept.

Money. — Measures. —Weights. — British money is the legal currency of the islands, but there is also a special bronze coin named a grano, which is equal to one-third of a farthing, or $\frac{1}{10}$d.

British imperial measures and weights are the only legal ones in use.

Climate.—The climate is excellent in winter, with bright sun and blue sky, the mean minimum monthly temperature in January, February, and March, being about 52° Fahr. In these months, gales from north-east, locally named gregales, occasionally occur. The summer in Malta is hot and relaxing, and the islands then well deserve the title conferred on them by Lord Byron, "A military hothouse." September and October is the season of south-east winds, named locally scirocco, during the prevalence of which it is useless to paint a vessel, to bottle wine, or to attempt to keep meat; it is then an unhealthy wind, laden with moisture, and produces lassitude and dyspepsia. South-east winds also occur at other times of the year, but they are not then so oppressive. A meteorological table is given in Appendix III.

The death-rate of the civil population in 1910 was 21·42 per mille.

Mediterranean fever has shown a considerable decrease among the civil population, and has practically ceased altogether in the Fleet and Garrison.

Chart 165, Sardinia to Malta, including Sicily.

SICILY, the most important island of the Mediterranean, is triangular in form (hence its ancient name Trinacria), the northern or longest side being about 150, the southern 140, the eastern 100 miles in length, and the whole area is about 10,000 square miles; it is separated from the mainland of Italy by the narrow strait of Messina.

The greater part of Sicily is mountainous; the average distance of the summits of the mountain ranges from the coast is about 10 miles. There are, however, isolated elevations, the most remarkable being that of the volcanic mountain of Ætna upon the east, 10,880 feet

Chart 165, Sardinia to Malta, including Sicily.

above the level of the sea. An extensive plain lying southward of Ætna is 20 miles in length in a westerly direction from Catania bay, and about 7 in breadth.

The shores are not deeply indented, and there are few off-lying features except the Ægadean islands off the western point.

It is divided into seven provinces, viz., Caltanissetta, Catania, Girgenti, Messina, Palermo, Syracuse, and Trapani, each governed by a prefect.

History. — The geographical position of Sicily led almost as a matter of necessity to its historical position, as the meeting-place of the nations, the battle-field of contending races and creeds. For this reason, too, Sicily was never in historic times (nor, it seems, in prehistoric times either) the land of a single nation; her history exists mainly in its relation to the history of other lands.

The Phoenician occupation came about 900 B.C.; the Greeks commenced to arrive about 100 years later, and gradually drove the Phoenicians into three considerable towns on the north-west corner of the island. From now on to 392 B.C. the fighting was constant between Greeks and Phoenicians. In 241 B.C., at the end of the first Punic war, Carthage ceded to Rome all her possessions in Sicily, and Sicily remained Roman until about 429, when it belonged variously to Teutonic powers, Vandals, and Goths, but was won back to the Roman Empire in 550, and remained so until 960. In the 9th, 10th, and 11th centuries Sicily was once more the scene of the old drama with the strife for life and death between Christendom and Islam. The Saracen invasion began about 655, and in 965 they had conquered the whole island, and remained in possession until the Norman Conquest in 1060. The island remained under Norman rule until 1302, when it became an independent power.

Sicily became once more united to Naples in 1443, and both countries remained under Spanish rule until 1720, when Sicily was surrendered to Austria. In 1733 the island was conquered by the Bourbons, and remained under their sovereignty, except for 1806-1815, when Napoleon made his brother king, until the successful revolution in 1860 under Garibaldi. On February 18th, 1861, the first Italian Parliament met, and Sicily became incorporated in the United Italian Kingdom.

Rivers.—Lakes.—The rivers are small, and there are none navigable except for boats; the principal are the Fiume Grande on the north, the Fiume Simeto and Alcantera on the east, the Salso, considered the largest on the island, the Platani and Belici flowing towards the south. The chief of the lakes, of which there are but few, is the Biveri or Lentini, which lies a little south of the plain of Catania.

Chart 165, Sardinia to Malta, including Sicily.

Geology. — Of the sedimentary rocks, none are earlier than the secondary period. The mountain range, from 3,000 to 6,000 feet above the level of the sea, consists of granite flanked with limestone and other calcareous formations.

Quaternary deposits border many of the bays, and the plain of Catania is wholly covered with recent alluvium; basalts and basaltic tufas border this plain on the south, as the ancient and modern lavas of Ætna do on the north.

Flora and fauna. — The flora is remarkable for its wealth of species, the orders, most represented, being Compositæ, Cruciferæ, Labiatæ, Caryophyllaceæ, and Scrophulariacæ; the Rosaceæ are also abundantly represented, and amongst them are numerous species of the rose.

There are fine forests of timber, especially around Ætna, on the sides of which the oak and chestnut thrive at 4,000 feet, and the beech at 6,000 feet above the level of the sea; amongst trees and shrubs is the sumach, the manna ash (Fraxinus ornus), the prickly pear, the agave, the date palm, the plantain, the dwarf palm, and various bamboos and cycads. The Arundo Donax, the tallest of European grasses, is indigenous.

The native fauna of Sicily is similar to that of southern Italy; tunny and sardines abound, and the rivers and lakes produce an abundance of fish.

Population. — By the last census, in 1911, the population of Sicily, including the islands, was 3,683,380, or about one-tenth of the population of the whole of Italy.

Products. — From its soil and climate Sicily is one of the most productive islands of the world; vines and other fruit trees are extensively cultivated, and the production of wine is about 100,000,000 gallons a year; the other products are olive oil, green fruit, citrus fruits, indian corn, sumach, and beans.

The chief mineral production is sulphur ore, obtained in the centre of the island and towards the southern coast; the other mining productions are rock salt and asphalt rock; the total value of the mining production in 1910 was £1,158,040.

Trade. — The principal exports are wines, citrus fruits, green and dry fruit, sulphur, rock asphalt, olive oil, silk, and sumach, and imports petroleum, timber, grain, hides and skins, irons and metals, colours and dyes, flour and staves, and 501,806 tons of coal were imported during the year 1910.

Shipping. — In 1910, 7,809 steam vessels, of a total tonnage of 8,918,208 tons entered the ports of Sicily, and 6,444 sailing vessels with a total tonnage of 377,752 tons.

Ports.—On the north coast are the artificial harbours of Milazzo, Termini Imerese, and Palermo; the east side of the island affords

Chart 165, Sardinia to Malta, including Sicily.

several safe harbours, viz., Messina, Catania (artificial), Augusta, and Syracuse; the south coast has two artificial harbours, named Empedocle and Licata, and, on the west coast, are the two artificial harbours of Trapani and Marsala.

Communications. — Steamships. — The following lines afford communication:—

The State railway has a steamer service from Palermo to Naples and back daily; from Naples to Messina, Reggio, Riposto, Catania, Syracuse and back twice a week.

A regular service of steamers of the Wilson line between Hull and Palermo, and of the General Steam Navigation Company, between that port and London.

Navigatione Générale Italiana.—Prom Palermo to Ustica, twice every week; to Cagliari, weekly; to Messina, Catania, the Levant, Constantinople, and Black Sea ports, weekly; to Trapani and Tunis, weekly. From Catania to Syracuse, Malta, and Tripoli, weekly; and a monthly service between Venice, and intermediate Italian ports and Calcutta, calling at Catania.

Adria line.—Syracuse to Malta, daily (Sundays excepted), and to Syracuse, Malta, and Tripoli, weekly.

Railways.—The main lines of Sicily are between Palermo and Messina; Palermo and Catania, and Messina and Syracuse, and in 1910 there were 806 miles of ordinary gauge and 15 miles of narrow gauge railways. From Palermo the railway runs near the coast to Messina, with stations at Bagheira, Termini Imerese, Porto Cefalu, San Stefano di Camastra, Sant' Agata di Militello, Naso, Patti, Barcellona, and Milazzo.

The Catania and Palermo railway joins the line between Palermo and Messina at Termini Imerese.

Between Messina and Syracuse there are stations on, or near, the coast at Scaletta, Giardini-Taormina, Giarre-Riposto, Acireale, Catania, Valsovoja, Lentini, Augusta, and Priolo.

From Syracuse the line is still near the coast, with stations at Avola, Noto, and Pozallo; here it turns to the westward, with stations at Vittoria, Terranova, and Licata, which latter place and Empedocle are both connected by railways with the Catania and Palermo railway.

From Trapani a line runs to the southward, with stations on, or near, the coast at Marsala, Mazzara, Campobello, and Castelvetrano: it then curves round to the northward to Castellamare, and is again near the coast to Palermo, with stations at Partinico, Carini, and Tommaso Natale.

Narrow gauge railways run from Castelvetrano to Selinunte and Partanna; and from Palermo inland to Corleone.

A railway from Catania circles round Mount Ætna to Riposto, a distance of 71 miles.

Chart 165, Sardinia to Malta, including Sicily.

Telegraph. — There are submarine cables across the Strait of Messina, a cable to Malta, one to Pantellaria, one to Ustica, one to Naples, and one to the Lipari islands.

Wireless telegraph. — Wireless telegraph stations have been established at Vittoria, near Scoglitti, which is always open to the public; and at Sferracavallo, near Palermo, open to the public from sunrise to sunset.

Time.—Mid-European time, or one hour fast of Greenwich mean time, is kept.

Money.—Measures.—Weights.—Gold coins are very scarce, the currency consisting chiefly of notes, silver, bronze, and nickel coins; the current coins are those of the Italian kingdom.

100 centesimi = 1 lira = specie, $9\frac{1}{2}$d. = paper, $8\frac{2}{10}$d.

Gold coins.—100, 50, 20, 10, and 5 lire.

Silver coins.—5, 2, and 1 lira.

Nickel coins.—20 and 10 centesimi.

Bronze coins.—10, 5, 2, and 1 centesimi.

The 5 centesimi piece is named a soldo and prices are sometimes quoted in soldi.

The measures and weights are those of the metric system, as in France.

Climate. — The climate of Sicily resembles that of Southern Europe, but the chief annoyance is the scirocco, which, experienced in its most characteristic form on the north coast, occurs frequently in April, in May, and September, but no month is actually free from it. There is a rainy and a dry season, the former commencing with thunderstorms in September and October, sets in steadily in November, but somewhat abates in February, and ends about the close of April; there is scarcely any rain in the dry season; continuous rain at any time is rare, but the heaviest fall is in December. Meteorological tables for Syracuse, Messina, and Palermo are given in Appendix III.

Chart 172, Lipari islands.

LIPARI ISLANDS. — These islands, forming a group off the north coast of Sicily, are the Insulæ Æoliæ of the ancients (from being the supposed residence of Æolus), and were also known as Hephæstiades or Vulcaniæ insulæ. Here, according to fable, Æolus held the winds imprisoned in caverns, and released them at his pleasure, and Vulcan forged the bolts of Jove.

The chief island was colonised in the 6th century, B.C., and they successively passed into the hands of the Athenians, Carthagenians, Romans, Saracens, and Normans, and finally Ferdinand the Catholic annexed them to Sicily.

Chart 172, Lipari islands.

The group consists of seven principal islands, viz., Stromboli, Panaria, Salina, Lipari, Vulcano, Filicudi and Alicudi, with several islets and rocks. They are all irregular in outline, and comprise with Ustica a coast line of 77 miles; they are mountainous and all of evident volcanic origin, with distinct craters on several, two of which are active.

The western coasts of all the Lipari islands are steep and craggy, rising abruptly in precipitous masses, and shelving down gradually to the eastward, some of them have a high isolated rock off their northern shores, a singularity extending even to Ustica.

They are governed by a delegate, subject to the prefect of Messina.

Geology. — Mountainous in character, the islands consist of tuffs and lavas, and of highly silicious volcanic products, such as quartz-trachyte, pumice, and obsidian. There are hot springs on the main island, and one at San Calogero has a temperature of 198° Fah.

Produce.—Cattle are scarce and lean, as the pasturage is suitable only for goats; but the land is well cultivated, and yields grapes, currants, figs, prickly pears, corn, cotton, olives, and pulse, the latter grown under the cane trellises that support the vines.

Rain, if violent, occasions great damage to the grounds, from the situation and friability of the soil, and swarms of locusts sometimes injure the produce severely.

Trade.—A considerable quantity of wine and currants is exported, and an active trade carried on in bitumen, pumice, nitre, pozzolana, cinnabar, coral, and fish; but alum, once a great staple, scarcely exists as an article of commerce, a failure supposed to be owing to the decreased heat of the subterranean fires. Sulphur is still exported, but not in the quantity it might be, in consequence of a prejudice existing that the vapour arising from the purifying of it infects the air and injures vegetation.

Ports. — The anchorages round the islands are principally suited for small vessels.

Communications.—Steamships.—There is communication daily between Milazzo, Lipari, and Salina, twice a week between Messina, Lipari, and Stromboli, and fortnightly between Messina, Lipari, Filicudi, and Alicudi, by steamers of the Società Siciliana di Navigazione. A steamer of the Navigazione Générale Italiana runs between Palermo and Ustica twice every week.

Telegraph. — There is a submarine telegraph cable from Ustica to Palermo. A cable from Milazzo to Lipari, from which there are cables to Salina, to Panaria, and to Vulcano.

Climate. — The climate is highly salubrious, and the weather generally soft and refreshing; but, though there are a few small

Chart 172, Lipari islands.

springs, there is a general scarcity of water, as the soil, consisting entirely of scoriæ, tuff, pumice, pozzolana, and ashes, without any intervening stony stratum (except occasional masses of obdurate vitrification) rapidly absorbs the moisture; the natives are, consequently, obliged to construct spacious cisterns, wherein rain water is kept with a cool temperature.

Charts 161a, b, Sardinia island.

SARDINIA (Ital. Sardegna) is the second largest island in the Mediterranean, and second only in importance to Sicily; it is of oblong form, extending for 147 miles in a north-north-east and south-south-west direction, with breadths varying from 55 to 80 miles. It lies southward of Corsica, with the Strait of Bonifacio, 6½ miles in width between, and, with its adjacent islands, 108 miles in circuit, has a coast line of 726 miles, and an area of 9,187 square miles.

The early history of Sardinia is entirely unknown. It was conquered by Carthage about 500-480 B.C. In 238 B.C. the island was handed over to the Romans, and was governed by them in conjunction with Corsica. Little was heard of the island under the Roman Empire, except as a granary, and as remarkable for its unhealthiness and the audacity of its brigands. After the Romans, the island passed into the hands of the Vandals, and on the fall of the Vandal kingdom in 534 it passed to the Byzantium Empire, and remained nominally under Byzantium until the 10th century. From 720 to 1022 the island was frequently raided by the Saracens, but in the latter year they were finally driven out by the Pisans and Genoese, the island becoming Pisan. In 1326 the Pisans were driven out, and it became a province of Aragon. The island remained a Spanish province until the war of the Spanish succession, when in 1708 Cagliari capitulated to an English fleet, and the island became Austrian. In 1720 Sardinia passed to the Dukes of Savoy in exchange for Sicily, and in 1840 it was merged into the kingdom of Italy, complete political union with Piedmont was granted, and the vice-regal Government suppressed.

A large proportion of the surface is hilly or mountainous; the principal range runs north and south at no great distance from the east coast, but the land is of considerable elevation in other directions. The highest peak is Monte del Gennargentu, which, near the middle of the island, rises 6,130 feet above the level of the sea, whilst that of Limbara, to the north, is 4,330 feet; upon these the snow lies for six and seven months in the year.

There are several extensive and elevated plains, the principal being those of Ozieri and Sassari in the north, that watered by the Tirso, in the centre, and the Campidano di San Gavido, between the Gulfs of Oristano and Cagliari, in the South-east.

Charts 161a, b, Sardinia island.

The most considerable streams are the Tirso or Tirsi, and Bosa on the west; the Coghinas on the north-west; the Flumendosa on the south-east; and the Samassi or Mannu on the south; there are also numerous small streams. Around the coast are some lagoons, and several bays, as those of Cagliari and Palmas on the south; Oristano on the west; Asinara on the north; Sassari and Orosei on the east.

The north-east and south-west coasts are of very irregular outline, islands and rocks lying a short distance off, between which and the coast (especially on the north-east) are many excellent anchorages protected from all winds, and adapted for all classes of vessels.

It is divided into two provinces, Cagliari in the south and Sassari in the north, these being subdivided into nine districts, viz.: Cagliari, Iglesias, Lanusei, Oristano, Sassari, Alghero, Nuoro, Ozieri, and Tempio, and is governed by a prefetto, who resides at Cagliari. Italian is the language of the educated class, but that generally spoken is Sarde, a mixture of Latin, Spanish, and Italian.

Geology.—The island is composed mainly of granite and other crystalline rocks; granite being estimated to cover half of the entire surface. In the western part of the island the crystalline rocks are principally porphyritic in structure; there are deposits of silurian and cretaceous times, but the sedimentary deposits are comparatively unimportant.

Minerals. — The southern portion of Sardinia is, as regards mineral wealth, the richest province of Italy; they are chiefly sulphates of lead, sulphates and silicates of zinc, iron pyrites, sulphates of iron and copper, of antimony, arsenic, besides cobalt, nickel, and silver.

Flora and fauna. — Many of the mountains were formerly covered, from base to summit, with dense forests of oaks, cork trees, chestnuts, beeches, larches, and pines, but these forests have been largely destroyed by the trees being burnt for charcoal and potash.

Amongst the wild animals, that known as the musimon, or European mufflon, is the most interesting, and of noxious animals are the scorpion and the tarantula.

The lagoons, near the coast, abound in mullets, eels, mussels, and crabs, and the sea fish are the tunny, anchovy, and the sardine.

Population.—In 1901 the population was 795,793.

Products. — The most fertile plains are in the southern part of the island, and produce wheat, barley, beans, &c., large quantities of the first named being grown.

Palms and groves of olive trees are found in the forest. Vines, orange, lemon, citron, fig, pomegranate, and the ordinary fruit trees of Europe, are abundant, and are found side by side with those of North Africa; flax, linseed, hemp, and barilla are grown.

The production of wine is very large, the manufacture of tobacco has considerably developed, and salt is produced in great quantity.

Charts 161a, b, Sardinia island.

In 1905, 4,351,987 bushels of wheat were produced, and 170,236 tons of minerals raised. Tunny and coral fishing are also carried out.

Trade.—The exports, principally consisting of minerals and manufactures of metals, wines, live animals and animal produce, hides and furriery, cereals and vegetable products, spirits, tobacco and oils in 1905 were valued at £1,388,735, and the imports, cereals, groceries, cotton, &c., at £1,085,514; but these values are only for the province of Cagliari. The island produced 36,700,000 gallons of wine, and the average production of olive oil is 1,216,770 gallons. In the year 1902, 1,752 steam, and 2,634 sailing, vessels, with aggregate tonnages of 1,845,146 and 211,115 tons, respectively, entered the Sardinian ports.

Ports.—The principal ports are Cagliari, on the south coast, Porto Torres and Carlo Forte on the west coast, Terranova on the east coast, and Maddalena on the north coast.

Communications.—Steamships.—By the steamers of the Navigazione Générale Italiana there is daily communication (often interrupted in bad weather) with Civita Vecchia from Golfo degli Aranci; there is weekly communication with Leghorn, Genoa, Naples, Palermo, and Tunis, and with Porto Torres, calling at the intermediate ports of the island. There is also a weekly French service between Porto Torres and Ajaccio, in Corsica.

Railways.—The main line of railway is from Cagliari northward to Aranci, a distance of 190½ miles, and at Decimo-Mannu, 10 miles from Cagliari, a branch runs to Iglesias and Porto Vesme on the south-west coast; further north on the main line, at San Gavino, a mineral railway runs to Monte Vecchio. At Macomer, 96 miles from Cagliari, branch lines run to Bosa on the west coast, and to the eastward to Nuoro. Alghero and Porto Torres, on the west coast, are connected with Sassari, and thence join the main line at Chilivani, and at Monti, 28 miles from Aranci, there is a short branch line to Tempio.

Cagliari has also railway communication, by narrow gauge, with Tortoli on the east coast, and on this line there is a branch at Mandas to Sorgono, almost in the centre of the island.

Telegraph.—Two submarine telegraph cables, connected by land wire with Terranova, are laid between the north-east coast of Sardinia and the west coast of Italy.

Wireless telegraph.—Wireless telegraph stations have been established at Capo Sperone, and at Isola Chiesa (Maddalena), which are always open; and one at Castiadas, which is open to the general public from sunrise to sunset.

Submarine vessels.—CAUTION.—Mariners are cautioned that exercises with submarines are being carried out daily in the approaches to Maddalena, at Baia degli Aranci, and in adjacent areas. Regulations for avoiding are given on page 658.

Time.—Mid-European time, or one hour fast of Greenwich mean time, is kept.

Money.—Measures.—Weights.—*See* Sicily, page 31.

Climate. — The climate is similar to that of the rest of the Mediterranean region: autumn, prolonged into December, is the most agreeable season, and winter is rainy. A meteorological table for Cagliari is given in Appendix. The intemperie, which differs from the malaria of Italy, it being pernicious at all times wherever it abounds, attacks even strangers landing for a few hours, and the cool air of evening or night should be especially avoided by them.

The natives also avoid the extreme heat of the day on account of sunstroke, and attribute its frequency and fatal effects to the malignity of the intemperie, to the sun becoming suddenly overcast, or to moving abruptly from the sunshine to the shade.

Inhabitants, who can afford residences on high ground, remove to them in June when the air begins to become unsafe, although it is not dangerous until August; those remaining on the lower ground keep well clad in woollens, avoid exposure to the sun or to summer showers and exertion, and adopt a spare diet. A severe headache, brought on by evening dew, is supposed to be a forerunner of intemperie.

Wind charts of Atlantic ocean, 2925 to 2928.

WINDS AND WEATHER. — Gibraltar strait. — Approach. — Within the great bight situated between Cape St. Vincent and Mazighan and eastward to Gibraltar strait, and more particularly in the vicinity of the strait, the prevailing winds are easterly and westerly.

Easterly winds, which are usually humid and unpleasant within the Mediterranean, and which accumulate dense clouds on the mountains near the eastern entrance of the strait, are dry and clear on the coasts of Cadiz, Huelva, and Algarve. Although the sky with easterly winds is clear, a white mist hangs over the land, increasing in density towards the horizon. If there is any cloud it is very light and elevated, of the description known as cirrus.

The most continuous easterly winds are those which commence gradually, and which do not reach Cadiz till the second or third day after they have commenced in the strait; those which begin suddenly and with much strength are less lasting.

Easterly winds prevail in summer, when they may last 15 days consecutively, and blow hard all the time. In winter, they are not so prevalent, and when established are clear till they alter to south-eastward, then clouds appear with perhaps showers, a sure sign that the wind will alter to southward and south-westward.

Westerly winds alternate with easterly, and are consequently common at all seasons; they are humid and are generally accompanied by

Wind charts of Atlantic ocean, 2925 to 2928.

cloudy weather. These winds do not blow with so much strength or persistence as easterly winds, and abate at sunset.

South-westerly winds of winter bring clouds, rain, and squalls, and obscure the land, but it clears between the squalls. These winds are generally preceded by a fall in the barometer, and commence from the southward, altering gradually to S.W., from which direction they blow hardest, and then shift suddenly to West, and even to N.W.; if they continue at N.W. the weather becomes fine, but with occasional heavy squalls and sometimes thunderstorms, moderating after altering to northward. In April and May these winds are usually moderate, with fine weather, although the sky may be overcast.

Sea and land breezes prevail on the coasts of Huelva and Cadiz during summer and sometimes in winter. The sea breeze, commencing about 9 a.m. acquires its greatest strength after midday, and it becomes calm at 8h. to 9h. p.m. After two or three hours of calm, the land wind sets in and lasts till sunrise.

Gibraltar strait.—The wind in Gibraltar strait is usually either easterly or westerly (named in Spanish—Levante or Poniente): but outside the eastern entrance of the strait the easterly winds blow from N.E. or S.E., and outside the westerly entrance the west winds blow from between N.W. and S.W. Strong south-easters are occasionally experienced in the strait, producing serious damage in Algeciras bay, particularly in winter.

The wind in the strait is usually strongest at its narrowest part: thus, although an easterly wind may be light between Gibraltar and Ceuta, it will be strong between Tarifa and Cires point, as well as in the western part of the strait. Also, westerly winds, which are moderate between Capes Trafalgar and Spartel, attain their greatest strength between Tarifa and Cires point, and preserve it in the eastern part of the strait.

The worst winds of the strait are south-westerly, commonly named Vendavales, these shift in squalls suddenly to West, or N.W. and even to North, and sometimes N.N.E. Between the squalls there are intervals of fine weather, with moderate wind; whilst if the wind settles between N.W. and N.E., it moderates, and fine weather ensues. On the contrary, if after suddenly changing to N.W., the wind changes to S.W., its strength continues, and there is much rain.

Winds from N.W., altering to N.E., are, however, rare in the strait. In winter they blow with considerable force, but the local mariners say that, although N.W. winds blow hard outside, they are not much felt in the vicinity of Tangier bay.

About the end of October, and in November, bad weather occasionally occurs in the strait, it being the short rainy season, which lasts from 15 to 20 days. In January, February, and March, S.W. gales (altering to W. and N.W.) and S.E. gales are frequent. These gales,

Wind charts of Atlantic ocean, 2925 to 2928.

at times very heavy, are accompanied by rain, and follow each other at short intervals. In February, March, and April, N.E. winds frequently bring rain and bad weather.

Easterly winds or Levanters, give timely warning of their approach; on shore, and especially at Algeciras, Gibraltar, and Ceuta, their approach is known 24 hours beforehand. An abundance of dew, a mist over the land, amounting to fog over the higher parts of Gibraltar and Apes hill, are almost certain indications of an approaching easterly wind; and these peculiarities continue while the wind lasts: sometimes a swell from the eastward anticipates the wind. If on approaching the strait from the westward Ronda hills appear near and distinct, it is almost certain that an easterly wind exists in the strait.

When easterly winds prevail on the coast between Cape Trafalgar and Cadiz the weather is squally near the land, but in Gibraltar strait the wind is steady and strong, and the weather misty. In-shore, principally in the bays, a calm prevails both morning and evening; or the wind is light near the land, while outside, especially in the middle of the strait, it is blowing hard. Easterly winds, instead of being dry, as they are on the coast between Cadiz and Trafalgar, are often very moist.

It often happens, and particularly in summer, that the Levanter does not reach Cape Trafalgar and Cadiz until two or three days after it has set in at Algeciras, where it will often be found blowing fresh, when in other parts of the strait it is calm, or the wind is from the westward.

During summer, easterly winds are seldom attended with rain in the strait; but as they cause more moisture in the eastern entrance of the strait than in the western, it often happens that the mist, which is formed on the heights of Gibraltar and Apes hill, occasions rain at the foot of these mountains, while there is fine weather in the strait.

In winter, usually during February, March, and April, N.E. winds frequently bring rain, and when they alter to East or S.E., generally freshen to a gale. These winds are squally and change suddenly to N.E. and sometimes North, however, in changing to N.E. they moderate, but if they again shift quickly to East or S.E., bad weather will continue, and be accompanied by heavy rain; the weather then is nearly always murky, and the sky is overcast.

Westerly winds or Ponientes. — When the summits of Gibraltar and Apes hill, after being covered with mist by a continuance of easterly wind, become more clear and conspicuous, and especially if the mist and clouds entirely disappear, it is a sign of the approach of a westerly wind.

At Algeciras, Gibraltar, and Ceuta, when the atmosphere becomes dry, a westerly wind may be expected; and when it has set in, the hills

and sky become clear, more especially so if north-westerly wind prevails in the Atlantic. A swell from the N.W. or S.W. also indicates the approach of a westerly wind.

In summer westerly winds are generally moderate, the sky is clear, and the land remarkably distinct; but if they freshen, it soon becomes overcast, bringing squalls and rain, and causing a considerable sea in the strait.

For local winds and weather, *see* also Index.

Fog.—In summer, and particularly in June, if, after strong easterly wind, large white clouds collect about the land in round masses, with a light south-westerly or westerly wind, and a thick fog bank is formed in the western part of the strait, it gradually gains on the land, and soon envelopes the whole strait. These fogs are sometimes as thick and wet as those which are met with on the coast of Newfoundland in the month of August; but they are only of a few hours duration and disappear as rapidly as they form. Trinity House reports, 1897-1903, inclusive, give a yearly average of 56 hours fog at Gibraltar. *See* table in Appendix III.

Rainfall.—November and December are the rainiest months, and in Gibraltar strait, south-westerly, westerly, easterly, and south-easterly winds, all generally bring rain; the rainfall at Gibraltar for a mean of 30 years is 35·62 inches, rain falling on 80 days.

In the greater part of the Mediterranean it rains more frequently with S.W. and west winds than with those from other quarters.

Occasionally, with S.W. winds, rain falls at Tangier whilst it is dry at Gibraltar; and it often happens, in the eastern part of the strait that the rain brought by easterly winds does not reach the western part.

Thunderstorms are most frequent in the months of September and October; they are not so common in April, May, and November, and rarely occur in other months of the year; they generally occur in the afternoon or at night, when the weather is uncertain, and the wind variable, and when experienced outside Gibraltar strait they are accompanied by squally weather.

Heavy gusts of wind, of short duration, blowing from opposite points, and clouds seen at different elevations, pursuing opposite directions, may be considered as the precursors of a thunderstorm.

The squalls are attended with a considerable quantity of rain, with intervals of fine weather and calms or light winds. When these squalls are strong they assume something of the character of whirlwinds, and shift rapidly through four, six, or even eight points of the compass, blowing harder as the changes are more rapid and considerable.

Mediterranean.—Prevailing winds.—In the Mediterranean, westerly winds prevail from October to May, and easterly

winds in the remainder of the year, and, with a few exceptions, this general rule applies to the whole of the south shore of the Mediterranean. Elsewhere, it should be observed that the rule is subject to considerable modifications owing to local conditions, such as the proximity of high land, &c.

Spain.—In the Spanish or Iberian peninsula, the winds blow outwards from Spain in winter, and inwards during summer. This is owing to the fact that an area of high pressure and low temperature exists over Spain during winter, and an area of low pressure and high temperature during the summer. The winds have a tendency to blow from the coldest towards the warmest areas.

In the western basin of the Mediterranean from May to September, easterly winds prevail between the Strait of Gibraltar and the meridian of Cap Fegalo, but the direction is from N.E. on the coast of Spain between Capes de Gata and Creus, shifting to the North and N.W. towards the Gulf of Lyons; and from East to E.S.E. between the Balearic islands and the coast of Africa.

With fine weather and a clear sky the easterly wind scarcely ruffles the surface of the sea, and is generally light from S.E. in the Gulf of Valencia and sometimes along the south coast of Spain. When the wind is S.E. to the eastward of Sardinia, it is E.N.E. and N.E. along the coast of Africa (following the direction of the coast) and becomes East in Gibraltar strait.

When S.W. winds prevail between the Balearic islands and the coast of Spain, it is common for N.E. or S.E. winds to be blowing in the Gulf of Lyons.

Easterly winds are, without exception, preceded by great humidity of the atmosphere and a thin mist which hangs about the coast, also by light white clouds which form on the slopes of the mountains, sometimes obscuring their summits; and often also by a hollow rumbling sound in the sea, even while a westerly wind is blowing, with a clear sky.

It often happens in summer that vessels on the coast of Africa experience easterly winds, accompanied by all the characteristics which distinguish them, while others on the coast of Spain have fresh westerly winds with fine weather, vessels in mid-channel being, at the same time, becalmed or experiencing variable winds.

When easterly winds are established they last a week, increasing in strength as the Strait of Gibraltar is approached, and blowing strongest during the day, fogs becoming thick and rain falling; usually in summer, when easterly winds are most frequent, these winds moderate gradually, but occasionally freshen again.

In the western basin, after the months of September and October the winds from the S.W. (or Vendavales) set in regularly, and alternate with those from N.W. and N.E.; and at about the end of September,

bring abundant rain. The month of November, however, is often a pleasant month, but to the northward of the Balearic islands and east of the Bay of Valencia, strong N.W. winds occur.

Westerly winds, generally prevail in November and December, when S.W. winds, blowing for a length of time, in the Atlantic, enter the Mediterranean with their full force; and although moderating slightly in passing over a part of Africa they regain their former strength on the coasts of Catalonia and France.

These winds invariably bring bad weather and heavy rains; when they shift to the westward they abate in violence and the sky becomes less overcast; if they shift to the N.W. they are fresh for a day or two, when the atmosphere clears, the wind gradually moderating and the weather becoming fine; if the wind shifts to the S.W. a return of bad weather, exceeding that already experienced, may be expected.

During the months of December and January, it frequently happens that, in the violent squalls accompanying S.W. winds, there is a sudden shift to the N.W., the wind retaining its original force, with, between the squalls, frequent intervals of clear weather.

During February, when the land is saturated with moisture and the heights are covered with snow, the Vendavales do not reach the coast of Spain, but become west or N.W. in the offing, so that vessels from the Strait of Gibraltar to Malaga, with a fresh S.W. wind may find, on reaching that bay, moderate breezes from the latter quarters; the same change may take place in the other bays of the coast.

In February and March the Vendavales lose somewhat of their strength, and alternate with winds from the eastward; the latter penetrate into all the bays of Spain and maintain their easterly direction to the Strait of Gibraltar, being always violent in winter and accompanied by thick weather.

Along the African coast, however, these easterly winds shift to the N.N.E. and N.E., continuing in either of these directions for two or three days, then shift to E.S.E. and S.E. and quickly to the South and S.W.; in the months of February and March the wind does not remain long in the latter quarter, but shifts to the West and N.W., where it remains stationary and the weather clears.

Winds from N.W., round by North, to N.E. generally bring fine weather and a clear sky, and are foretold by the clearness of the atmosphere which allows distant objects to be easily distinguished. The contrary occurs with those from South to W.S.W.

Opposing winds. — It is observed in the western basin that counter winds are frequent, often blowing simultaneously from opposite quarters at no considerable distance apart, there being at the time a cloudless sky.

These winds, named Contrastes, produce a heavy sea upon the coast; they are most frequent near the period of the equinoxes in March and April, and in September and October, and are most commonly felt in the Strait of Gibraltar and in the vicinity of the Capes of Spain and Provence.

The Contrastes are less violent on the African than on the Spanish coast, and it not uncommonly happens that whilst these opposing winds are met with in-shore, a fresh wind from the westward is blowing in mid-channel between them. At the equinoxes the Contrastes are often accompanied by heavy thunderstorms, rain, and violent squalls, and not unfrequently by waterspouts.

Land and sea breezes.—During the fine season, land and sea breezes are frequent on the coasts of the western basin, particularly in the bays of the coasts of Spain; they are, however, felt at but a short distance from the coast, and generally shift in the same direction as the hands of a watch.

The sea breeze commences regularly between 9h. and 10h. a.m., freshening towards noon and attaining its greatest strength between that and 2h. p.m., then subsiding gradually towards sunset, and becoming calm at nightfall. Two or three hours afterwards the land breeze springs up, attains its greatest strength at daylight, and then gradually gives place to the sea breeze.

Gales.—Violent gales occur in the Mediterranean, and are frequent from November to April; they are principally experienced from N.E. or N.W.

N.W. gales blew with much violence on the coast of Africa and in the Bay of Valencia, and are especially strong in the Gulf of Lyons; they shift to the North on the coast of Spain, the Balearic islands and the coast of Algeria; these N.W. gales are more severe than those from other directions in the Mediterranean.

Easterly and south-easterly gales preserve their direction, with but slight variation, from the coast of Syria to the Strait of Gibraltar.

Gales from the North are (as above mentioned) experienced in certain parts of the western basin; they may be considered, however, as being local variations of the N.W. gales of the Gulf of Lyons.

Gales from the South are almost unknown in the western basin of the Mediterranean.

Generally speaking, the wind in these storms does not pass consecutively through the several points of the compass; when the gale begins at N.E. or E.N.E. it shifts to East, and afterwards to the S.E., altering rapidly to South and West, and ultimately N.W., when, should the wind remain steady from this quarter, a clear sky and fine weather ensues. Gales setting in from S.S.W. and S.W. alter also to the West and terminate at N.W.

Barometer.—An area of comparatively low pressure exists over the Mediterranean in summer and an area of high pressure in the winter, the barometer being highest in January and lowest in April. With small fluctuation it remains low until September, when it again rises, and at this time the great cyclone over the continent of Hindustan begins to fill, and the Atlantic anti-cyclone to move eastward.

In endeavouring to forecast the weather therefore, seamen should consider the normal or average pressure proper to the locality at the season of the year; the rapidity of the change, with other signs which are familiar, observing that in the northern hemisphere, the effect of the shifting of the wind on the barometer is according to the following law:—

With East, S.E., and South winds -	Barometer falls.
„ S.W. winds - - - - -	„ ceases to rise and begins to rise.
„ West, N.W., and North winds	„ rises.
„ N.E. winds - - - - -	„ ceases to fall and begins to fall.

Waterspouts.—These phenomena, of usual occurrence in the Mediterranean at all times, are more frequent at the change of the seasons, and especially so in the autumn; they pass off in rain and violent discharges of electricity, and are often accompanied by heavy squalls of wind.

They most frequently occur during calms or light variable winds, and always accompany the setting in of the Vendavales (S.W. winds), when they form in great numbers in the vicinity of the Strait of Gibraltar; they are generally met with off salient points of the coast, especially off Capes de Gata, Antonio, and Creus, and in the vicinity of the Balearic islands.

It is improbable that a waterspout could cause any great damage to a large vessel, but it should, under any circumstances, be avoided if possible. Waterspouts always indicate opposing currents in the atmosphere, the squalls which produce them being generally accompanied by thunder and lightning.

At night the proximity of a vessel to a waterspout will probably be first made known by a violent whirlwind, occasioning, in a sailing vessel, a loss of sails, &c. Heavy masses of clouds known as nimbus and cumulo-stratus should, when seen at night, be carefully watched, as they indicate a probability of the existence of these phenomena.

Thunderstorms are very frequent in the Mediterranean; and are sometimes very heavy, especially at the change of the seasons (the period of strong opposing winds and of rains): they are invariably preceded by a fall of the barometer.

On the coast of Spain, from Gibraltar to Cape Creus, and in the Bay of Valencia, they are most prevalent during September and October; on the coast of Africa, from July to September, more particularly during the latter month.

Las Tascas.—The waves, named Las Tascas, by the seamen of Barcelona, originate in the Gulf of Lyons, break at times in fine weather and are the precursors of wind from the N.E. or E.N.E., which may be expected to set in within 24 hours; this phenomenon is observed even in the bays and creeks of the Bay of Alicante, and is there a sure sign of a northerly wind, as also of an easterly wind in the Bay of Valencia, where (when clouds known as the cumulus collect beyond Cape Oropesa, in the direction of the land stretching seaward) winds from the N.E. and East may be expected.

LOCAL WINDS.—Alicante.—The following table gives the number of days in each month on which the various winds prevailed at Alicante:—

Month.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
January - -	2	4	1	2	1	7	2	12
February - - -	1	4	2	4	2	4	1	10
March - - - -	1	6	3	6	4	5	1	5
April - - - -	1	3	3	7	5	3	1	7
May - - - -	0	5	3	11	4	4	1	3
June - - - -	0	3	4	13	5	2	1	2
July - - - -	0	2	4	17	5	1	1	1
August - - - -	0	2	4	16	5	2	1	1
September - - -	0	6	3	12	4	2	0	3
October - - -	1	6	2	8	4	4	1	5
November - - -	1	5	1	4	3	5	2	9
December - - -	3	5	1	1	1	5	2	13
Year - -	10	51	31	101	43	44	14	71

Valencia.—In the Bay of Valencia, during summer, light N.E. winds prevail, which reach the head of the bay by day, and are succeeded by the land wind at night, when there will be no danger in closing with the coast to profit by the change. At times in the summer, the wind is S.W. in the bay, whilst it is easterly outside. Southerly and S.W. winds are not strong in the bay during summer, and are only felt in force northward of Valencia; with winds from S.W. to N.W. a vessel may get shelter under the land.

The N.W. wind, named El Maestral, is very prevalent in winter, and though not strong near the land is much felt in the offing, vessels frequently having to seek shelter at the Balearic islands.

When a N.W. wind sets in, after a gale from the opposite quarter, it blows for the first few hours with much force, but moderates in about 12 hours. The N.W. wind clears the sky, and frequently its approach

is indicated by a remarkable clearness of the atmosphere, showing the distant land with great distinctness; occasionally a small white strip of mist is seen which rapidly forms on the horizon and rises to the zenith; when, with a previously clear sky, this light fog or mist is observed, it will be prudent to prepare for a gale.

As in all gulfs, the wind at N.W., which in the middle blows straight down it in the general direction of the gulf, alters considerably as vessels approach either side of the entrance; the wind hauls to the westward near Cape Oropesa, and to the northward near Cape San Antonio; these changes influencing the local set of the current, and at times greatly increasing the difficulties of navigation.

In the winter the N.E. gales are severe, and alter to East and E.S.E., with heavy squalls, rain, and thunder; should the gale shift to S.E., it will probably alter to the southward and westward, and terminate at N.W. These gales are usually foretold by a fall of the barometer, the eastern horizon being covered with thick whitish clouds; they usually commence from northward of East, moderate at first but increasing in force as the wind shifts to the S.E., blowing with great violence and causing a heavy sea on shore.

The following table, showing the number of days in each month on which the various winds prevailed at Valencia:—

Month.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
January	4	1	1	0	1	4	14	6
February	3	2	0	0	1	4	13	5
March	5	3	2	1	1	3	11	5
April	4	4	2	1	1	2	12	4
May	3	7	5	2	1	2	8	3
June	2	6	7	3	1	2	7	2
July	3	6	7	5	1	1	4	4
August	3	6	5	3	1	1	6	6
September	5	4	3	3	1	1	8	5
October	4	2	1	1	1	3	13	6
November	2	2	1	0	0	3	16	6
December	3	2	1	0	1	4	14	6
Year	41	45	35	19	11	30	126	58

The winds at Cartagena and Barcelona are given in Meteorological tables in Appendix III.

Balearic islands.—Owing to the position of these islands with respect to the Gulf of Lyons, winds from North to N.E. are frequent; from May to September inclusive winds from E.N.E. to E.S.E. prevail, veering to the S.E. between the islands and the coast of Africa; so that frequently when a N.E. wind is blowing northward of the Balearic islands a S.E. wind is blowing southward of them.

Strong N.W. winds occur to the northward of the islands in the month of November, when it may be fine at the same time to the south

of them. Westerly winds set in about the latter end of November, and are mostly fresh from S.W.; if they haul to the westward they moderate, but if they shift to N.W. they are violent for one or two days, after which fine weather may be expected. If after altering to N.W. the wind shifts to S.W. again, it is a sign of a continuance of bad weather.

When these winds set in between the Balearic islands and the coast of Spain, they generally blow from N.E. to S.E. in the Gulf of Lyons, consequently very stormy weather is experienced northward of the islands. For winds at Palma, *see* Meteorological table in Appendix III.

Minorca.—Northerly winds prevail at Minorca for two-thirds of the year, and at times blow with such force as to carry the spray across the island, covering the ground with a slight coating of salt. These northers in winter continue for fifteen or more consecutive days, and have been known to blow from the north-west and last for two months with but short interruptions.

During summer they usually blow strong for twenty-four hours, and terminate about the third day; at this season they are attended with clear weather, and frequently preceded by a sea; but in winter the first days are generally marked by stormy weather. North-west winds are also accompanied by showers, but they seldom last more than three or four days, and fall light in the evening.

South-west and southerly winds, though not frequent in winter, set in with stormy weather and blow very hard, generally terminating between west and north. In summer the weather is generally fine, with south-west or south-east winds, but in winter, when they increase to a gale, they are accompanied with thick weather, which completely obscures the island.

In winter strong northerly and north-westerly winds are experienced at Port Iviza.

Coasts of Marocco and Algeria.—The winds on this coast are generally from East or West, following the trend of the coast. The easterly winds predominate in summer, and blow between E.N.E. and E.S.E., at times shifting to N.E. but not to S.E., unless at night in the bays, or very near the land. They are preceded by a red sky in the evening, and by a light mist on the horizon and land. (*See* page 40.)

In the summer, squalls of wind and rain usually advance from the westward against the wind, shifting suddenly and as suddenly returning to the prevailing wind from the East.

Within the bays and during summer, the sea breeze prevails during the day, while in the offing it follows the general trend of the coast either from the eastward or westward; but at sunset it becomes light and shifts to S.E. and perhaps to South, if the wind is from the east-

ward in the offing; or to S.W. if from the westward. In summer if winds shift to the North, they are light, and indicate fine weather.

The westerly winds which prevail from October to April are generally fresh in November, blowing in gusts, and accompanied by rain and a heavy sea. In December these winds become stronger and the weather very boisterous, particularly if they draw to the N.W.

If the wind shifts to N.N.W. or North it may blow a gale, and is often foretold by a heavy swell from the northward, and by heavy patches of clouds which rise above the horizon in that quarter, accompanied by thunder and lightning. As the wind freshens, the rain increases.

Westerly winds are announced by a remarkable transparency of the atmosphere, by the dryness of the air, and the clearness of the land. If the peaks of the mountains have light clouds hanging about their eastern slopes it is indicative of a westerly wind; but if on the western slopes it is a sign of an easterly wind. Lightning on the horizon during summer generally indicates wind from the opposite quarter, but in the winter from the same quarter.

Southerly winds are rare on this coast, but when the weather has been fine during the day they frequently spring up after sunset or before sunrise in the bays and near the coast; but they seldom blow with much force, and are of short duration.

The Scirocco (Simoom) blows from off the desert of Sahara, from S.S.E. to S.S.W. on the coast of Marocco, and on the coast of Algeria from between South and S.W. It is usually moderate in strength, blowing in scorching puffs, and sucks up moisture from the sea like a sponge, raising the temperature considerably, and causing an oppressive feeling; but is not frequent and lasts only a few days consecutively.

The Scirocco may blow at any time of the year, but it is twice as frequent in summer as in winter. At Algiers, on an average, it blows for about 30 days in the year, of which five days are in the winter, seven in the spring, eleven in the summer, and seven in the autumn.

Gales are usually experienced on this coast in December, January, and February; they may be considered local rather than general, as they do not blow with the same intensity throughout its whole extent, but as is usual with all these gales, if the wind shifts in a direction against the hands of a watch, the gale continues with redoubled violence. On the coast about Algiers, they commence at West and N.W. Gales occurring between Cap Bon and Bougie commence generally from East or N.E., shifting to the northward, from which quarter they frequently blow with great violence. *See* also page 409.

On the coast of Marocco, they generally commence at S.W., altering to West and W.N.W., from which quarter they blow hardest, generally moderating as the wind shifts to N.W.

Local winds, Tetuan.—When north-east and easterly winds blow strong on this part of the coast, especially in winter, the land becomes covered with mist, concealing it from view, however near; but if the wind shifts to the northward the slopes of the mountains become clear, whilst the summits remain covered.

With north-west winds the land becomes quite clear, which is also the case with south-west winds, and this is generally a sign of a south-west or southerly wind. Easterly winds prevail most in the months from June to September, when they are fresh at a distance from the land, but light or calm in-shore during the day.

The following table gives the numbers of days, in each month, on which the various winds prevailed at Nemours.

Month.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January - -	4	1	4	4	3	1	7	3	3
February - -	3	1	3	4	3	2	5	3	4
March - -	4	1	7	3	3	1	6	3	3
April - - -	3	1	5	4	3	1	7	3	3
May - - -	4	2	5	4	3	1	4	3	5
June - - -	6	2	5	2	2	1	2	2	8
July - - -	6	2	5	2	2	1	2	2	9
August - -	6	0	5	3	2	1	2	4	8
September - -	8	1	6	2	3	1	2	3	4
October - -	5	1	6	3	4	1	4	3	4
November - -	5	1	5	3	3	2	7	2	2
December - -	6	3	6	2	3	1	5	2	3
Year -	60	16	62	36	34	14	53	33	57

The winds at Oran and Algiers are given in Meteorological tables in Appendix III.

Rainfall.—The rainy season on this coast may be said to extend from October to April, but rain falls in every month of the year. The maximum rainfall occurs in the months of November and December, the minimum in July and August, and over Algerian territory it may be subdivided under three districts as follows:—

In the Eastern district, on the side of Bougie, the maximum fall is from 43·3 to 47 inches; the central district, comprising Algiers, has a fall of 27·5 inches; and the remaining portion, a fall of about 17 inches. To the southward of the high plateaux and in the Sahara district the fall is scarcely 8 inches, and in the Sahara itself rain is extremely rare.

Rain frequently falls after the Scirocco, and it is noteworthy that more rain falls during the night than day. Snow is seldom seen on the coast of Algeria.

Coast of Tunis. — The winds on this coast largely depend on those that develop in the two basins of the Mediterranean. The coast may be divided into three zones: The north coast between Algeria and Cap Bon, which corresponds with the Sardinia channel; the middle zone between Cap Bon and Ras Kapudia, which corresponds with the Sicily and Malta channels; and the east coast between Ras Kapudia and Tripoli, which belongs to the eastern basin of the Mediterranean.

Rainfall.—The average rainfall at Bizerta is 25 inches, at Tunis 17 inches, and at Susa 13 inches. Meteorological tables for Bizerta, Tunis, and Susa are given in Appendix III.

Sardinia channel.—In the channel between the south coast of Sardinia and the coast of Africa, the predominant winds, during the summer, are from East, E.N.E., and sometimes N.E., occasionally alternating with winds from E.S.E., but seldom shifting to the S.E. excepting near the land during the night. These winds are generally moderate, following the trend of the coast near the land; and bringing up a thick mist which becomes very dense if the wind freshens, rendering it difficult to distinguish the land except from a very short distance. When the easterly winds blow fresh, the sky becomes overcast, the weather gloomy, and dew falls heavily.

Near the African coast at this season, the wind falls at sunset, shifting to the southward and becoming a land breeze. In summer, westerly winds sometimes blow, altering during the night to S.W.; they are preceded by a cessation of dew, and when they are moderate the weather is clear; if the westerly wind lasts it is generally fresh during the day, moderating at night; if, however, it has set in with squalls and rain, it generally shifts again to the eastward as suddenly as it came.

During the winter (October to April) the prevailing winds are from the westward between N.W. and S.W.; they are strong during the early part of winter, and are usually accompanied by rain; but in February, March, and April, they moderate. If, however, the westerly wind alters to the North (especially to the westward of Sardinia), it generally blows hard from that quarter, a very heavy sea being one of the results. Winds from the South are rare and of short duration.

Sardinia.—The most prevalent winds are the north-west and the south-east, the first of which is the more healthy. The sea breezes (imbattu), which usually blow in towards noon, are exceedingly refreshing during the heat of the day; they fall calm as the sun goes

down, and are succeeded in the evening by the rampinu, or land wind.

North-east wind brings heavy rains; the east wind, or bentu de soli (the coming of which is indicated by clouds gathering on the summits of the mountains) is usually accompanied by very vivid lightning, and, from its being laden with vapour, becomes extremely disagreeable after a long continuance. The Maledetto levante, a south-east wind, is the scirocco of Sicily, and has a debilitating effect on the natives, while the north wind, from its opposite quality, is known as the serche, or dry wind. A Meteorological table for Cagliari is given in Appendix III.

Fogs. — Commander Thomas MacGill, H.M.S. *Alexandra*, 1887, states that caution is necessary in approaching the coast of Sardinia should the lights be obscured, as, although it may appear clear at sea, and apparently the land could be seen some miles distant, the fact that the lights cannot be seen indicates that there is a thick mist over the land, so that it is impossible to see it even at a distance of one or two cables. This is much more dangerous than ordinary fog, as the weather is clear at sea.

Fogs are said to occur frequently in the early morning in Bonifacio strait in the month of May.

Sicily channel. — In the channel of Sicily, between Sicily and the coast of Africa, the winds in the summer are the same as those experienced further westward; with this difference only, that they shift to S.E. and sometimes South, the atmosphere being very moist; the wind from this quarter is known as the Scirocco. Winds from the westward at this season incline to the N.W., and are accompanied by fine weather.

In the winter, N.E. and N.W. winds prevail, and sometimes blow very hard; with the former the sky is overcast and rains are frequent, the wind often shifting to the S.E. and blowing hard for several days. N.W. winds often shift to the West and S.W., when they bring bad weather.

With winds from West, round by north, to N.N.E. the weather is generally clear. Calms are frequent, and about the time of the equinoxes alternate with squalls and thunderstorms.

Sicily. — In September the winds blow alternately from N.E. and S.W., from October to March S.W. winds prevail. In April, like September. From May to August, the winds are chiefly from the N.E. The most experienced pilots say that storms which commence in the day time are more violent and of longer duration than those which spring up during the night.

The Scirocco is among the few drawbacks to the climate of Sicily. This wind, which comes from the deserts of Africa, is moderated by its passage over the sea to a tolerable degree of temperature; and on

the east coast, where it first arrives, its effects are inconsiderable, but seeming to acquire additional heat in its progress over the land, becomes a serious inconvenience as it advances.

At its commencement the air is dense and heavy, with long white clouds settling a little below the summits of the mountains, and at sea floating just above the horizon in a direction parallel to it; the highest range of the thermometer is from 90° to 95°, but the feelings indicate a much higher temperature, the humidity increases, and the barometer falls to about 29·60.

The Scirocco often continues three or four days, and although blighting in its general effects in summer, in winter it is favourable to some vegetation. This wind is particularly felt at Palermo, the streets become nearly deserted, and the doors and windows are closed to exclude it; in spring and autumn it is more frequent than in summer, and in winter is no longer disagreeable.

Meteorological tables for Syracuse, Messina, and Palermo are given in Appendix III.

Malta channel. — In the Malta channel, winds from East to S.E. are most prevalent during the summer, the latter sometimes shifting to the southward (Scirocco), the atmosphere becoming thick and humid, and being accompanied by lightning. Calms are frequent.

In the winter the same winds are experienced (N.W. and N.E.) as prevail further westward; they are, however, as a rule, stronger, and often freshen to a gale; with winds from N.E. to S.E. the sky becomes overcast, and it rains heavily, but with westerly winds the weather is clear.

Gales from N.W. and N.E. are frequent in these channels during the winter, and often blow with great violence; a gale from the latter quarter is termed a Gregale, and is especially destructive in the vicinity of the Maltese islands.

Malta. — From December to March the winds occasionally blow with great force, the sky being clouded, with an abundance of rain, the Gregale, or north-east, wind, being especially destructive from its violence. In March the weather is more settled and dry, but in April and May there are occasional showers.

In June the heat is considerable, and continues to increase during the summer, the winds being light and mostly from the N.E. and N.W. In September the sky begins to be obscured by clouds; towards the evening the atmosphere is charged with electricity, which produces frequent lightning, often attended with heavy thunder.

The Scirocco or south and south-east winds occur with great suddenness, chiefly in September, October, and November. They are so laden with humidity, and so hot as to render the climate almost insupportable. These winds never blow long at a time, seldom lasting more

than three or four days; they are frequently succeeded by a calm, during which the heat is very great but much less oppressive, though the thermometer frequently shows a much higher degree of real heat.

A Meteorological table for Malta is given in Appendix III.

LOCAL NAMES FOR VARIOUS WINDS IN THE MEDITERRANEAN.

NORTH.—Tramontana (from the mountains); and Gli Secchi, or day winds, by the Italians; when from N. to N.E. they are called Osure by the fishermen in the Gulf of Lyons.

NORTH-EAST.—The Gregale of the Italians and Maltese.

EAST.—Solano and Levanter of the Straits. Levante; Bentu de Sole; and when light, Chocolatero by the Italians.

SOUTH-EAST.—Scirocco, the hot debilitating wind of South Italy and Africa; Maledetto Levante; Molezzo, the damp wind; and in the Adriatic when strong, Furiante.

SOUTH.—Mezzo Giorno (mid-day); from S. to S.W., Simoom, Shume, or Siume, on the African coast, from off the Sahara desert.

SOUTH-WEST.—Vendavales; also Lebeches, and Virazones, by the Spanish. Libeccio (Libyan or African); when gusty, Labeschades; and when very stormy, accompanied by lightning, rain, &c., it is called Ouragans by the Italians. Labbetch, in Algeria; and Siffanto in the Adriatic. It is the hottest wind in the summer at Malta.

WEST.—It is called in the Straits the Liberator. Ponente by the Italians.

NORTH-WEST.—The Mistral, Mistrasu, the Bize, and Grippe, also the Vent de cers of France. Maestro and Maestrale, of the Italians; and when light it is called Mamatele by the Sicilians. N.N.W.—Provenzale by the Italians of Leghorn.

A sea breeze, Imbattu; a land breeze, Vento di Terra, or Rampinu; land squalls, Raggiature, by the Italians. Mountain storms, Burrasche, South Italy; and Raffiche in Corsica. Golfada, a hard gale. Bonaceia, calms between land and sea breezes, in Italy; La Lispa, a calm with a cloudy sky, in the Strait of Messina, with a fresh breeze blowing outside.

The meeting of opposing winds is called Contrastes by the Spaniards. A heavy gale, Golfada, by the Italians.

The years, in which the east winds prevail, are known in the Mediterranean as "Àno de Levantes," and of west winds, "Àno de Ponentes."

Monthly current charts for Atlantic ocean, 2951 to 2956.

CURRENTS.—Gibraltar strait.—In the bight between Cape St. Vincent and Rabat to Gibraltar strait the current is very variable, it sometimes runs eastward, increasing in strength as the strait is approached, and having, on the coast of Spain a south-easterly, and on the coast of Africa a north-easterly, direction.

South-westerly gales cause a north-easterly current on the African coast, a northerly current on the coast near Cadiz, and north-westerly to westerly towards Cape St. Vincent, which occasionally attain a rate of 2 knots an hour.

Mediterranean.—The set of the surface currents in the Mediterranean (independently of tidal streams) is to the eastward, subject to variations in velocity and direction caused by prevailing winds and local circumstances.

The easterly current, on entering the Mediterranean through the Strait of Gibraltar, flows along the coast of Spain, as far as Cape de Gata, thence it turns in an east-north-east direction as far as Cape Palos, and from that north-easterly as far as Cape San Antonio and the Balearic islands.

With the wind to the southward of West, the current has a north-eastward tendency to set along the coast of Spain, but with N.W. winds it has an easterly to south-easterly direction. When N.W. winds are blowing in the Gulf of Lyons, a south-westerly current is experienced along the west coast of Sardinia, which sets to the southward among the Balearic islands, and along the coast of Spain, ultimately uniting with the easterly current along the African coast.

From the Strait of Gibraltar, as far as the meridian of Malaga, the easterly current has been known to attain rates of from 4 to 5 knots an hour; between the meridians of Malaga and Cape de Gata, from one to 2 knots an hour; from Cape de Gata to Capes Palos and San Antonio its velocity is rather less. With a succession of strong easterly winds the current is weakened, but with winds from West and S.W., its velocity is greatly increased.

In the vicinity of the Balearic islands, the currents vary under the influence of the prevailing winds, but the general direction, to the southward of the islands, is E.S.E., drawing northward through the channels, and at times setting strongly. To the eastward of Minorca the prevailing stream, for about two-thirds of the year, is to the south and south-west, running about a knot an hour off Cape Mola, increasing in velocity with a gale out of the gulf.

Under ordinary circumstances and in settled weather when the current from the Atlantic takes its usual course into the Mediterranean, it runs to the eastward along the African coast, with a velocity of about a knot an hour, as far as Cap Bougaroni, beyond which it depends upon the winds; setting more frequently towards the east than the west.

The general current in mid-channel is south-easterly as the Riff coast is approached; and in the vicinity of Alboran island it has generally the same direction, sometimes inclining more to the southward, with rates of from one knot to 1½ knots. On the coast of Algeria during fresh north and north-west winds, the current sets to the south-

eastward, and sometimes more southerly, with considerable strength. Near Galita island and the Sorelle rocks, the current frequently runs to the south-westward at rates of from one knot to 3 knots, and is especially strong near the latter danger.

Off Cap Tres-Forcas the edge of the current approaching the land produces a counter-current, which sets in a west-south-west direction along the Marocco coast as far as Velez de la Gomera, where it trends to the northward of Ceuta. This westerly counter-current is experienced in-shore all along the coast of Africa, at an uncertain distance from the land, and is probably from one mile to 2 miles distant from it; and the line of demarcation between the currents is marked by ripplings.

The currents near Cap Bougaroni sometimes set strongly towards the shore.

In the channel between the coast of Tunis and Sicily, the current, under ordinary circumstances, and especially in fine weather, sets to the eastward (especially near Cap Bon and across the entrance of the Gulf of Tunis), at a rate of from half a knot to one knot. In the middle of the channel, near Skerki bank and Keith reef its direction is more variable, and, with westerly winds, it has been known to attain a velocity of 4 knots. In the vicinity of Cap Bon, after a succession of winds from North and N.W., the direction of the current is often to the southward and south-south-westward.

In this channel with a S.E. gale it has been found setting E.N.E. nearly 2 knots an hour, and at Keith reef with a N.W. wind S.E. by E. 3 miles an hour; but on other occasions the current has been known to set N.N.W. in this locality. H.M.S. *Thunderer*, during a moderate N.W. gale in the month of February, 1881, found between Pantellaria and Cap Bon the current setting S.W. by S., at the rate of one mile an hour.

In the Malta channel, the current ordinarily follows the direction of the prevailing wind; with westerly winds, it often sets strong to the eastward in mid-channel, but near the coast, however, its direction is variable.

Reactions of the tidal stream against the coasts, the effect of winds and the variable currents, induced by the smaller straits in the basin, occasion lateral and adverse currents in all directions. The most marked examples will be found in the Gulfs of Lyons and Genoa, in the Strait of Bonifacio, and in the Gulf of Syrtis. Strong ripples and eddies are frequently met with in the neighbourhood of the islands and banks.

TIDES.—The tidal wave arrives almost simultaneously at Mogador in Africa and Rota in Spain, and entering the strait, causes high water, at about the same time, on all the coast between Cape Plata and Europa point. It is not, however, until about 20 minutes

after it has attained its highest level on the coast of Spain that the water reaches its highest level on the African coast opposite.

Chart 142, Strait of Gibraltar.

TIDAL STREAMS.—The movement of the whole body of water in the Strait of Gibraltar is tidal, affected by the surface current running into the Mediterranean from the Atlantic.

The following table shows the approximate time of change of tidal stream on the different days of lunation:—

Age of Moon.	Inshore Zone or between pecked line shown on the chart, Gibraltar strait, No. 142, and the coast.	
	East-going stream begins at	West-going stream begins at
Days.	Hrs.	Hrs.
0 or 14	10½	4½
1 ,, 15	11¼	5¼
2 ,, 16	12¼	6¼
3 ,, 17	1	7
4 ,, 18	1¾	7¾
5 ,, 19	2½	8½
6 ,, 20	3½	9½
7 ,, 21	4¼	10¼
8 ,, 22	5¼	11¼
9 ,, 23	6	12
10 ,, 24	7	1
11 ,, 25	7¾	1¾
12 ,, 26	8¾	2¾
13 ,, 27	9½	3½
14 ,, 28	10½	4½

In the main body of the strait the east-going stream is continuous, though usually checked during the period of the west-going stream or during easterly winds, the stream changing about 3 hours later than in the inshore zone.

Within a cable of Tarifa the west-going stream at spring tides has a rate of 2 to 3 knots an hour; but at neaps it is reduced to little more than one knot an hour. At springs the tidal stream, near the coast and in the bays, runs at rates of from 1½ to 2 knots an hour, but at neaps there are places where it nearly ceases. These in-shore streams run, faster or slower, according as they continue with or set against the prevailing easterly current.

When the east-going tidal stream is running, the combined stream and current at a cable distant from Tarifa, attain rates of from 4 to 5 knots an hour, and from 5 to 6 knots an hour at 4 miles north of Alcazar point.

When the west-going tidal stream in-shore is running the rate of the general east-going set, through the strait, is considerably diminished, its rate on the meridian of Tarifa being only from 2 to

Chart 142, Strait of Gibraltar.

3 knots an hour in the middle of the strait, rather more than one knot near Tarifa, and 2 knots on the African coast. A west-going stream is experienced along the shores, but at a distance depending on the time of tide and always at a greater distance from the Spanish than the African coast.

Near the shore of Cala Grande, on the African coast, between Al Boassa and Cires points, the stream continually sets to the westward, and is of much use to sailing vessels bound to westward through the strait with foul winds.

It is only during easterly winds and calms that a decided set to the westward (maximum rate one knot an hour) is experienced in the middle of the strait. The nearer a vessel is to the edge of the in-shore zones, as indicated by the pecked lines upon the chart, the greater is the chance of finding slack water, or a westerly set, at the proper time outside these zones.

The preceding remarks refer only to the surface water; the bottom stratum is unaffected by the in-running current of the Atlantic, and sets east or west for equal periods according to the tide, the change in the tidal streams corresponding with the tides of high and low water at Gibraltar.

On the submarine ridge at the western entrance to the strait, the surface and bottom streams are tidal, the in-running current from the Atlantic not being sufficiently strong to overrun the west-going stream.

Charts 92 and 142.

TIDAL RACES.—There are probably few places where tidal races are more numerous than in Gibraltar strait. They are generally found off all the salient points of the strait where the direction of the coast changes, and near the banks in their vicinity, and form without warning, the sea becoming like boiling water; short, irregular, and deep.

These races are dangerous for open boats, and even for small vessels, and the wind, which contributes to form them, always augments their violent character. The most turbulent races in the strait are generally where the angle of the point is most acute, and off which the water is not deep; they are generally formed when the tidal stream is strongest.

In some parts both streams produce these races; in others, the race is only produced by the east-going stream. The points on the Spanish coast where races are found, are—Cape Trafalgar, the Cabezos shoals, Tarifa point, Fraile point, the Pearl rock, and Europa point. On the African coast—Cape Spartel, Points Malabata, Altares, Al Boassa, Cires, Leona, and the north-east point of Almina de Ceuta.

Off Cape Trafalgar a race forms at the strength of both streams.

Chart 142, Strait of Gibraltar.

It extends to a considerable distance off the cape in a W.S.W. direction, crossing La Aceitera shoal, and all the Trafalgar or Phare banks. This race, which is more formidable both in extent and violence than any other in the strait, most probably arises from two causes—the sudden change of direction in the coast, and the number of banks off it.

A race also forms with both streams on Cabezos shoals, or near them, and varies in extent and direction; sometimes its area is considerable. Although not so violent as the races off the points, it causes a troubled sea even in calm weather, and with bad weather, and much sea, it extends across the strait to the flats between Malabata and Al Boassa points.

The race off Tarifa point is comparatively small; with the east-going stream it extends to the south-eastward, and, with the west-going, south-westward. It appears at the strength of each tidal stream, that on the east-going being the more considerable. The races off Fraile and Europa points are very similar, the first resembling that of the Cabezos shoals and the last that of Tarifa; but they are less extensive and less violent.

On the African coast, off Cape Spartel, Judios point, and Tangier point, the races are generally small and of little importance, although they are found with both streams. The worst races are between Malabata and Al Boassa points, over Almirante rock, Phœnix, and Jaseur banks, and, as above mentioned, the races reach across the strait to the Cabezos shoals.

The races off Cires, Leona, and other points, as far as Ceuta, are of small extent; they are sometimes violent, but only during the strong east-going stream. In the strait, and principally to the northward of Tangier, there are occasional eddies as well as counter streams at spring tides, but they are of small extent and short duration.

Sea level.—The sea level varies with the direction of the wind, and is much influenced thereby. The water rises with west winds, and falls with east winds, the greatest difference due to these causes being 2½ feet. These rising and falling movements often precede the coming of the wind. *See* remarks on this phenomenon at Port Mahon, page 276; at Porto di Bonafacio, page 717, and at page 207.

LIGHTS. — Some of the Spanish lights are placed high, and implicit reliance should not be placed on seeing them from the distance given.

On the coast of France, *fixed* lights of the catoptric character (or by reflectors), which are described as being visible through a limited arc, may, from within the distance of $\frac{3}{10}$ or $\frac{4}{10}$ of their given range of visibility, be seen 55° to 60° on each side of the centre of such arc, when not otherwise obscured, or unless the sector is clearly limited

by special arrangements of reflectors or screens. Other things being equal the greatest power of these lights is in the axis of the sector, and it is greater the smaller the sector.

Light-vessels. — Spanish, French, and Italian light-vessels do not carry riding lights. French light-vessels can communicate by the International code of signals.

For further information regarding lights, light-buoys, and fog signals, *see* General Navigation, page xxii.

PILOTAGE.—Steering commands.—The system of steering commands, in which the terms starboard and port signify that the vessel's head is to go to starboard and port and not the helm, have been adopted by Austria, France, Germany, Greece, Holland, Italy, Japan, Norway, Portugal, Russia, Spain, and Sweden.

Spanish.—In Spanish ports, pilotage is generally compulsory for merchant vessels of over 50 tons.

Foreign vessels of war are exempt from compulsorily taking a pilot in Spanish ports, and they are not required to pay pilotage due unless a pilot is employed.

If possible, they will be directed by signal where to anchor, but if this cannot be done they will have to shift to the position required.

In any navigable river in which pilotage is compulsory for merchant vessels it shall also be so for vessels of war.

The pilots cruise off the ports in boats, or will come off on the pilot signal being made.

French. — Steam vessels of 100 tons, and sailing vessels of 80 tons and upwards, must take a pilot to enter or leave French ports, and also to shift berth if the distance to be moved is a cable or above. In some ports vessels drawing 7½ feet and over must take a pilot, whatever may be the tonnage. If a vessel enters or quits a French port without a pilot, the pilotage fee has nevertheless to be paid.

The master of a vessel liable to pilotage should on approaching a port, road, or river, hoist the pilot signal, keeping it flying until the arrival of a pilot having the right to pilot him, or until the vessel is clear of dangers. The first duly licensed pilot offering himself has to be received, and if, for any reason, a second pilot should be received and employed, both have to be paid. Should a local fisherman or boatman be taken in the absence of a pilot, the pilot signal should be kept hoisted, and on a licensed pilot presenting himself he must be given pilotage charge. Every facility must be given to pilots in boarding vessels.

Government vessels, both French and foreign, as well as yachts, pay, as a rule, half the dues fixed for laden vessels of the same tonnage. At many stations there are special rates for these vessels.

During the day, as long as there is a pilot on board, pilot vessels

hoist at the mainmast head a blue flag bordered with white (letter S, International code).

A vessel requiring a pilot shall, by day, hoist one of the following signals:—

(1) A blue flag with a white border (letter S, International code) below the code pendant, or the vessel's national flag, bordered with white.

(2) The International code signal P T (Require a pilot).

(3) The distance signal, consisting of two balls or two objects resembling balls, over a cone, point upwards.

Pilot vessels.—The following distinguishing marks and signals are established for the pilot vessels on the coast of Algeria.

The vessels are painted black with white streaks. The initial letter of the name of the station to which the vessel is attached, and the number of the vessel, are painted on each sail; this letter and number are carried forward and aft on the hull. An anchor is also painted on each sail.

During the day—A pilot vessel, when taking a pilot to a vessel, carries at the masthead a white flag with blue border: this flag is dipped several times, until answered by the vessel. At night—Pilot vessels show a *white* light several times at intervals of *fifteen seconds* during one minute; this signal is to be repeated every *fifteen minutes.*

During the day—When requiring a pilot, hoist a white flag with blue border (or the National flag) at the foremast head. At night—when requiring a pilot, show a *white* light above the gunwale, and screen it several times at intervals of *fifteen seconds* during one minute. This signal should be accompanied, if necessary, by *blue* lights, burnt at intervals of at least *fifteen minutes.*

The stations in which pilots have the right of pilotage are generally of small extent; when they pilot a vessel outside these limits the pilot signal should be hoisted for the pilot of the station the vessel enters, and the pilot on board must give up charge on the proper pilot presenting himself.

Lights.—The following regulations with regard to pilot vessels have been adopted by the French, Italian, and Spanish Governments:

Pilot vessels, when engaged on their station on pilotage duty, shall not show the lights required for other vessels, but shall carry a *white* light at the masthead, visible all round the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed *fifteen minutes.*

On the near approach of, or to other vessels, they shall have their sidelights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the *green* light shall not be shown on the port side, nor the *red* light on the starboard side.

A pilot vessel of such a class as to be obliged to go alongside a vessel to put a pilot on board, may show the *white* light instead of carrying it at the masthead, and may, instead of the coloured lights above mentioned, have at hand ready for use, a lantern with a *green* glass on the one side and a *red* glass on the other, to be used as prescribed above.

A steam pilot vessel, exclusively employed for the service of pilots licensed or certified by any pilotage authority or the committee of any pilotage district, when engaged on her station on pilotage duty and not at anchor, shall, in addition to the lights required for all pilot boats, carry at a distance of 8 feet below her *white* masthead light a *red* light, visible all round the horizon, and of such a character as to be visible on a dark night, with clear atmosphere, from a distance of at least 2 miles, and also the coloured sidelights required to be carried by vessels when under weigh.

When engaged on her station on pilotage duty, and at anchor, she shall carry, in addition to the lights required for all pilot boats, the *red* light above mentioned, but not the coloured sidelights.

Pilot vessels, when not engaged on their station on pilotage duty, shall carry lights similar to other vessels of their tonnage.

BUOYAGE. — Algeria. — The following system of buoyage, established on the French coasts comprises all marks, fixed or floating, which serve to indicate by day, either existing dangers, or the limits of navigable channels, *i.e.*, buoys, beacons, beacon-towers or turrets, jetty heads, rocks, and convenient natural objects, but does not include ordinary landmarks, mooring buoys, &c.

All buoys and beacons employed are characterised by their colour and the shape of their topmarks, but in certain cases, the topmarks deviate from the rule, as when on light-buoys, whistling buoys, &c.

The term *starboard* means the right hand approaching from seaward; the term *port* the left hand. The term *separation* marks is given to those marks placed at the seaward extreme of middle grounds; the term *junction* marks to those placed at the inshore extreme of middle grounds; and marks, placed on shoals of small extent, are named *isolated dangers*:—

1. Starboard marks are painted red, and surmounted by a topmark of conical shape; if necessary, they are numbered with even numbers, commencing from seaward.
2. Port marks are painted black, and surmounted by a topmark of cylindrical shape; if necessary they are numbered with odd numbers, commencing from seaward.
3. Separation marks are painted white and black, in horizontal stripes, and surmounted by a topmark, formed of two cones, bases together.
4. Junction marks are painted red and white, in horizontal stripes, and surmounted by a topmark formed of two cones, points together.

5. Isolated danger marks are painted red and black, in horizontal stripes, and surmounted by a spherical topmark.

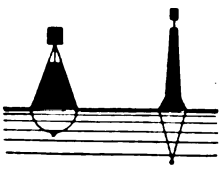
6. Wreck marks, either buoys or vessels, are painted green; lights are used according to circumstances.

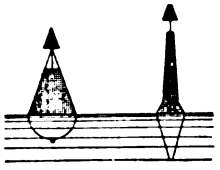
7. Names or numbers on marks are painted white.

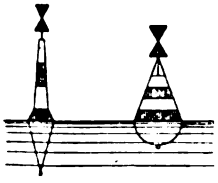
Warping buoys in French ports which are not part of the buoyage system are painted white.

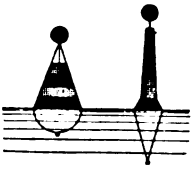
ILLUSTRATION OF SYSTEM.

(Black signifies black. Shading signifies red. Blank signifies white.)









Spanish. — The system of buoyage, of the Spanish coasts, comprises all the marks fixed and floating, especially buoys and beacons of all kinds, which serve, by day, to indicate existing dangers, or the limits of channels practicable for navigation.

All marks employed in the buoyage are characterised and distinguished by their colour and the shape of their topmarks. In the case of some sound and light-buoys the topmarks may be wanting, in which case they are distinguished by their colour alone.

The term *starboard* means the right-hand side approaching from seaward; the term *port* means the left-hand side. In channels which are open to the sea at both ends the more westerly end is considered to be the seaward entrance for this purpose. Dangers advanced from the coast which must be left on the land side are indicated by starboard marks.

The marks situated at the seaward extremity of banks separated from the shore (middle grounds) are called *separation* marks, and those placed at the opposite (in-shore) extremity of these banks are

called *junction* marks. Marks placed on banks and rocks of small extent, separated from the shore, and round which vessels can navigate, are called *isolated danger* marks.

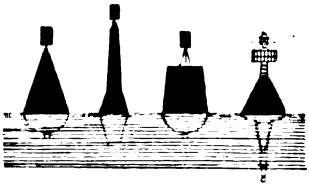
1. Starboard marks are painted red and surmounted by a triangle of the same colour; when forming a series they are numbered with even numbers, in white, commencing from seaward.
2. Port marks are painted black and surmounted by a cylindrical topmark of the same colour; when forming a series they are numbered with odd numbers, in white, commencing from seaward.
3. Separation marks are painted black and white in horizontal stripes, and are surmounted by a black ball.
4. Junction marks are painted white and red in horizontal stripes, and have a red topmark, consisting of a half-globe, curved side upwards.
5. Isolated danger marks are painted red and black in horizontal stripes and have a red topmark, consisting of a globe above a half-globe, curved side upwards.
6. Wreck marks, and those indicating the position of submarine cables have no topmark, and are painted green, with the words *Neufragio* or *Telégrafo* in white, respectively.
7. Starboard light and sound buoys have no topmarks; those on the port hand have a small cylindrical basket on the top.
8. Mooring buoys, which may form part of the system of buoyage, are painted according to their respective positions, in accordance with the above rules; other mooring buoys are painted white.

The names of the dangers, which may be inscribed on the marks which indicate them, are painted in white, either in full or abbreviated.

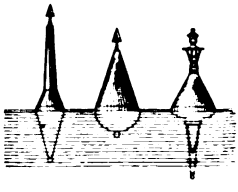
ILLUSTRATION OF SYSTEM.

(Black signifies black. Vertical shading signifies red. Blank signifies white.)

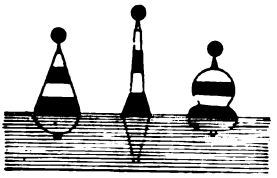
PORT HAND BUOYS.
Light red.



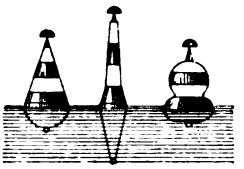
STARBOARD HAND BUOYS.
Light green.



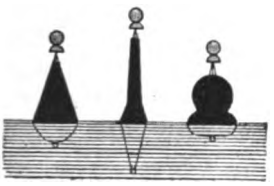
SEPARATION MARKS.



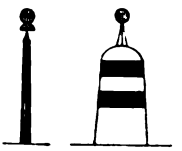
JUNCTION MARKS.



ISOLATED DANGER MARKS.



BEACONS.



Isolated Danger. Separation.

Italian. — All buoys, beacons, and seamarks, placed along the coasts of the kingdom of Italy will, in time, be painted as follows:—red, those to be left on the port hand, and black, those to be left on the starboard hand when entering a port or channel.

The new colouring will be applied gradually, and notice will be given when change is made.

PORT REGULATIONS.—British Empire.—Vessels inconvenienced by searchlights.—Any vessel approaching a port in the British Empire when searchlights are being worked, and finding that they interfere with her safe navigation, may make use of the following signals, either singly or combined:—

(*a*) By flashing lamp, *four short* flashes followed by *one long* flash.

(*b*) By whistle, siren, or fog horn, *four short* blasts followed by *one long* blast.

Whenever possible, both flashing lamp signals and sound signals should be used.

On these signals being made, the searchlights will be worked, as far as circumstances will permit, so as to cause the least inconvenience, being either doused, raised, or their direction altered.

The signals should not be used without real necessity, as unless the vessel is actually in the rays of a searchlight it is impossible to know which searchlight is affected.

Note.—These signals are designed to assist mariners, and do not render the Government liable in any way.

French. — All French ports of importance are subject to port regulations, which are strictly enforced, and to which ready attention

and obedience should be shown. In some cases anchorage is forbidden within certain areas, and notices are published to that effect. Mariners, visiting French ports, should ascertain beforehand what late Notices to Mariners have been issued regarding prohibited anchorages.

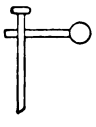
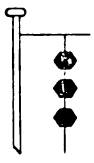
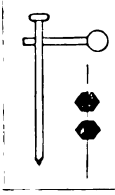
For regulations regarding the admission of foreign war vessels to French territorial waters and ports in time of peace, and for all vessels approaching French territorial waters in time of war, *see* Appendix VII., page 749.

Signals prohibiting entry.—A uniform system of signals has been established to indicate when vessels are prohibited from entering or leaving French ports. This system comprises only three signals, viz., "Entry to the port is prohibited," "Leaving the port is prohibited," and "It is prohibited either to enter or leave the port."

Supplementary signals, applicable to the special circumstances of each port, will continue to be made.

The three signals above-mentioned will be made, according to the installation provided at the port, by means of one or other of the two series of signals, as follows:—

SERIES A.

DAY.	NIGHT.		DAY.	NIGHT.
		Entrance prohibited.	Horizontal arm with a disc at the end generally pointing towards the fairway.	Three Red Lights vertical.
		Vessels prohibited from leaving the port.	Three hexagonal shapes or discs placed vertically.	Three Green Lights vertical.
		Vessels prohibited from either entering or leaving the port.	Horizontal arm with a disc at the end generally pointing towards the fairway and two hexagonal shapes or discs placed vertically.	Three lights placed vertically, a green between two red.

SERIES B.

	Entrance prohibited.	A Red Flag.	A Red Light.
	Vessels prohibited from leaving the port.	A Green Flag.	A Green Light.
	Vessels prohibited from either entering or leaving the port.	A Red Flag above a Green Flag.	A Red Light above a Green Light.

Vessels inconvenienced by searchlights.—Every vessel seriously inconvenienced by searchlights which are being exercised at defended ports or by French ships-of-war, should make use either separately, or as far as possible at the same time, of the following signals:—

(*a*) By flashing lamp, *four short* flashes followed by *one long* flash.

(*b*) By whistle, siren, or fog-horn, *four short* blasts followed by *one long* blast.

These signals should not be used without real necessity, and only when the vessel finds herself actually in the rays of a searchlight, when only can it be seen which searchlight is inconveniencing her, and which will then be doused or its direction altered.

The signals should be repeated until the searchlight has been doused or its direction altered.

Vessels failing to use these signals will be held responsible for accidents that may occur.

Italy.—The general regulations for fortified ports of Italy do not allow vessels to approach, within range of the defensive works, by day, without permission being given to do so, and all vessels, wishing to enter, should fly their national flag. Blank or shotted cartridge may be fired across the bows of any vessels, coming within the range, before permission is granted.

Vessels are absolutely forbidden to approach sea fortresses by night.

In time of war, boats are not allowed to move about, within the

radius of the sea defences, and can only communicate with the shore by day.

Whenever a naval harbour is to be put in a condition of war, the Commandant of the same, whenever occasion requires it, may order all vessels, men-of-war and merchant vessels, which may be anchored in the defence zone, to sail or proceed to those other points which he may find convenient to assign them. Vessels receiving such sailing orders must proceed outside the artillery firing line within 12 hours from the time such orders are conveyed on board them.

All possible facilities, subordinate to the requirements of the naval harbour, are offered to those vessels not in a position to sail within the stated time.

In carrying out these orders the Commandant may have recourse to any means that necessity or urgency may justify.

Vessels of war. — (A) The following regulations for foreign vessels of war anchoring in Italian ports have been issued by the Italian Government.

1. Foreign vessels of war cannot remain at fortified ports for a period of more than eight days, and not more than three vessels of the same flag may assemble at these anchorages, unless formal permission, which must be applied for through a diplomatic channel, has been received.

2. The following fortified ports are to be saluted by vessels of war: Genoa, Spezia, Gaeta, Taranto; also Naples and ports where an Italian war-vessel capable of returning the same may be lying.

3. Foreign vessels of war anchored in any of the above-mentioned places must leave at any time if requested, and at the expiration of the period stated in Article I.

4. The naval authorities will probably send an officer to point out the anchorage assigned to the vessel, but in the event of this not being done anchorage may be taken up as convenient.

5. Should pratique be refused, the medical officer of the vessel should be sent to the Local Sanitary Office to ascertain the treatment to which the vessel or vessels are to be subjected, and all Port Regulations must be carried out.

6. No surveying or hydrographic operations are to be carried on without special permission from the Government, and the following are also forbidden within the territorial waters: (*a*) The execution of a death sentence. (*b*) Vessels carrying on hostilities with each other, or bringing prizes or searching vessels. (*c*) Landing to execute manœuvres on, or gun practice within gun range from the coasts, without special permission.

7. With the exception of officers and petty officers the crew of a foreign vessel must always land unarmed, and should it be wished to send an armed funeral party, permission must be obtained.

(B) The following regulations are to be observed in time of war:—

(1) Every vessel approaching a fortified harbour by day must hoist her national flag before coming within range of artillery fire, and must remain outside the range of the guns of the forts whilst signals are exchanged, and until permission to enter the port is granted.

The failure to comply with this regulation will cause first blank cartridge and afterwards shot, if necessary, to be fired at the vessel from the nearest fort.

No vessel may enter a fortified harbour at night.

(2) The movement of boats, belonging to neutral war-vessels, within the area of fortified harbours, is absolutely prohibited, both by day and by night, but vessels anchored in the harbours may communicate with the shore during the day in accordance with rules laid down by the commandants, and in cases of urgency a boat, belonging to the fortress, may be obtained to communicate at night, by signalling the request. Any other signalling is strictly forbidden.

(3) Vessels wishing to anchor in any of the naval or fortified ports of Italy, a list of those included in this work and of their signal stations being given below, must not approach such ports within a distance of five miles, and must ask permission by means of hoisting, in addition to the name of the vessel, the International pilot-signal, or the International code signal P.D., "Permission is urgently requested to enter harbour."

Port of Anchorage.	Locality.	Signal Stations with which vessels must communicate.
Maddalena road and approaches -	Sardinia -	Capo Ferro.
Messina - - - - - -	Sicily - -	Forte Spuria.
Milazzo - - - - - -	,, - -	,,
Villa San Giovanni - -	Italy, W. Coast	Capo d'Armi.
Reggio - - - - - -	,,	,,

SEMAPHORES.—Spanish.—The signal stations, on the coast of Spain, where semaphores are maintained, are not painted in any distinguishing colour, but the keeper's dwellings, quite distinguishable from other dwellings, are painted black and white in stripes.

The stations are connected by telegraph, and vessels can communicate by the International code, sending or receiving telegrams at fixed charges.

French.—Semaphore stations in Algeria are connected with the general telegraphic system, and all vessels can communicate by the

International code either with the marine authorities or with commercial houses, and the messages are forwarded by telegraph.

Distress signals. — Should a shipping mishap occur in the vicinity of a signal station on the Algerian coast, signals will be hoisted at the International code signal mast as follows: —

(*a*) A black flag at the masthead indicates that a mishap has occurred in the immediate vicinity of the station.

(*b*) A black flag at the yardarm indicates that the mishap has occurred to the right of the station, looking to seaward.

(*c*) A black flag at the gaff indicates that the mishap has occurred to the left of the station looking to seaward.

Guns may be fired *every five minutes* to attract attention.

Italian. — The stations are generally, but not always, painted black and white, in checks, and the arrangements for signalling, with the exception of the semaphore arms, are similar to those on the coast of France and elsewhere.

Distress signal. — Vessels in distress should make the signal S.O.S.

TIME SIGNALS are made at Gibraltar, Malta, Catania, and Messina.

WEATHER SIGNALS.—French.—The following signals are hoisted at French semaphore stations and port offices for half an hour in the morning and evening, and indicate the weather existing at sea: —

1. A flag of any colour indicates: —weather doubtful; barometer inclined to fall.
2. A short pendant indicates: —appearance of bad weather, heavy sea; barometer falling.
3. A pendant indicates: —appearance of better weather; barometer rising.
4. A flag over a short pendant indicates: —entry into the port is dangerous.
5. A short pendant over a flag indicates: —the lifeboat is going out.

In fine settled weather no signal is made.

STORM SIGNALS.—French.—Storm signals are made at the semaphore stations and port offices on the coasts of France, and remain hoisted for 48 hours from the time of receiving notice from the Minister of Marine.

Signal.	Signification.
A cone, point upwards	Gale probable from north-westward.
Two cones, points upwards	Gale probable from north-eastward.
A cone, point downwards	Gale probable from south-westward.
Two cones, points downwards	Gale probable from south-eastward.
Two cones, bases together	Gale of hurricane force probable.

Sudden shifts of wind.—No signal is employed to indicate a wind which is likely to shift suddenly, but a southerly wind is much more likely to shift to the north-westward than a northerly wind is to shift to the south-eastward; and when the south cone is hoisted a vessel should prepare for a gale from the north-westward.

Meaning of Signal.—Any of these signals indicates that there is an atmospherical disturbance in existence, which will probably cause a gale from the quarter indicated by the signal used within a distance of about 50 miles of the place where the signal is hoisted, and the knowledge of which is likely to be of use to seamen. Its meaning is simply—Look out! Bad weather, as indicated, is probably approaching you.

Italian.—The undermentioned system of storm signals is in use on the coasts of Italy, Sicily, and Sardinia.

Day Signal.	Night Signal.	Signification.
A cone, point upwards -	A *red* light over two *white* lights, vertical.	Gale probable commencing from N.W.
Two cones, vertical, points upwards.	ditto	Gale probable commencing from N.E.
Two cones, vertical, points downwards.	Two *white* lights over a *red* light, vertical.	Gale probable commencing from S.E.
A cone, point downwards	ditto	Gale probable commencing from S.W.
Two cones, vertical, bases together.	A *red* light between two *white* lights, vertical.	Gale probable, direction of wind uncertain.

Coal and Telegraph, chart 1188.

COAL SUPPLY.—The various ports where coal may be obtained are enumerated below; those where less than 500 tons are kept in stock are marked *, and those where the supply is uncertain†. The latest information as to quantity kept in stock and facilities for coaling will be found in the description of the various ports.

South and S.E. coast of Spain.—Gibraltar, Marbella†, Malaga, Almuñecar†, Salobreña†, Motril, Adra*, Almeria, Mazzaron, Cartagena, Alicante, Gandia*, Valencia, Porto Sagunto†, Tarragona, Barcelona, and Palamos.

Balearic islands.—Palma† and Port Mahon.

Marocco and Algeria.—Tangier, Beni Saf, Oran, Algiers, Bougie*, Philippeville and Bona.

Tunis.—Bizerta, Tunis, Susa, Sfax, and Gabes.*

Malta.

Sicily.—Trapani, Palermo, Milazzo, Messina, Licata, Catania.

Sardinia.—Porto Torres and Cagliari.

NAVAL ESTABLISHMENTS. — In the area described in this book in addition to His Britannic Majesty's dockyards at Gibraltar and Malta, there is a Spanish Government dockyard at Cartagena, an Italian naval establishment at Isola della Maddalena, Sardinia, and a French naval establishment at Bizerta, Tunis.

DOCKS.—There are Government and private docks at the following places; the private docks are marked with an asterisk.*

Gibraltar and Malta; Cartagena and Barcelona* in Spain; Algiers in Algeria; Bizerta and La Goletta* in Tunis; Messina* and Palermo* in Sicily; and Maddalena in Sardinia, this latter being for torpedo boats only.

For particulars, *see* Appendix I.

BRITISH CONSULAR STATIONS. — Spain. — Algeciras, San Roque, Marbella, Malaga, Adra, Almeria, La Garrucha, Aguilas, Mazarron, Cartagena, Porman, Alicante, Burriana, Denia, Gandia, Valencia, Tarragona, Barcelona, San Feliu de Guixols, and Palamos.

Balearic islands.—Palma, Port Mahon, and Port Iviza.

Marocco.—Tangier and Tetuan.

Algeria.—Oran, Arzeu, Algiers, Philippeville, and Bona.

Tunis. — Bizerta, Tunis, Susa, Monastir, Mahedia, Sfax, Gabes, and Jerba.

Sicily. — Trapani, Palermo, Milazzo, Messina, Mazzara, Marsala, Girgenti (Porto Empedocle), Licata, Terranova, Mazzarelle, Pozzallo, Syracuse, Catania, Taormina, Lipari.

Sardinia. — Sassari, Cagliari, Terranova, and Carloforte; Sant' Antioco and San Pietro being included in this latter.

FISHING VESSELS.—Lights.—The following regulations with regard to fishing vessels have been adopted by the French, Italian, and Spanish Governments:—

Fishing vessels and fishing boats, when under weigh, and when not required by these Regulations to carry or show the lights hereinafter specified, shall carry or show the lights prescribed for vessels of their tonnage under weigh.

(*a*) Open boats, by which it is to be understood boats not protected from the entrance of sea water by means of a continuous deck, when engaged in any fishing at night with outlying tackle extending not more than 150 feet horizontally from the boat into the seaway, shall carry one all-round *white* light.

Open boats when fishing at night with outlying tackle extending more than 150 feet horizontally from the boat into the seaway, shall carry one all-round *white* light, and in addition, on approaching or being approached by other vessels, shall show a second *white* light at least 3 feet below the first light, and at a horizontal distance of at least 5 feet away from it in the direction in which the outlying tackle is attached.

(*b*) Vessels and boats, except open boats, as defined in subdivision (*a*), when fishing with drift-nets, shall, so long as the nets are wholly or partially in the water, carry two *white* lights where they can best be seen. Such lights shall be placed so that the vertical distance between them shall not be less than 6 feet, and not more than 15 feet, and so that the horizontal distance between them, measured in a line with the keel, shall not be less than 5 feet and not more than 10 feet. The lower of these two lights shall be in the direction of the nets, and both of them shall be of such a character as to show all round the horizon, and to be visible from a distance of not less than 3 miles.

Within the Mediterranean sea sailing fishing vessels of less than 20 tons gross tonnage shall not be obliged to carry the lower of these two lights; should they, however, not carry it they shall show in the same position (in the direction of the net or gear) a *white* light, visible from a distance of not less than one sea mile, on the approach of or to other vessels.

(*c*) Vessels and boats, except open boats as defined in subdivision (*a*), when line-fishing with their lines out and attached to or hauling their lines, and, when not at anchor or stationary, shall carry the same lights as vessels fishing with drift-nets. When shooting lines, or fishing with towing lines, they shall carry the lights prescribed for a steam or sailing vessel under weigh respectively.

Within the Mediterranean sea sailing fishing vessels of less than 20 tons gross tonnage, shall not be obliged to carry the lower of these two lights; should they, however, not carry it, they shall show, in the same position (in the direction of the lines), a *white* light visible from a distance of not less than one sea mile on the approach of or to other vessels.

(*d*) In fog, mist, falling snow, or heavy rainstorms, drift-net vessels attached to their nets, and vessels when trawling, dredging, or fishing with any kind of drag-net, and vessels fishing with their lines out, shall, if of 20 tons gross tonnage or upwards, respectively, at intervals of not more than one minute make a blast; if steam vessels, with the whistle or siren, and if sailing vessels with the fog-horn; each blast to be followed by ringing the bell.

Fishing vessels and boats of less than 20 tons gross tonnage shall not be obliged to give the above-mentioned signals; but if they do not they shall make some other efficient sound signal at intervals of not more than one minute.

Chart 2158a, Mediterranean sea, western sheet.

TUNNY FISHERIES.—During certain seasons of the year, fishing nets, of large size and great strength, are moored in various localities, for the purpose of catching tunny; they are sometimes more than 2 miles from the shore, and in describing the different coasts their positions will be given, as they should be carefully avoided.

The fishing season varies somewhat in different parts. On the coast of Spain, Africa and the Balearic islands, under Spanish jurisdiction, the season extends from 1st February to 30th October. On the coasts of Sicily and Sardinia the season is between March and November. On the Algerian coast the season is from April to the end of October, and on the Tunisian coast from 1st April to 1st July.

An abridged description of the nets, and methods of taking the tunny at Favignana, given by E. M. de Garston, Esq., H.B.M., Acting Consul at Palermo, 1899, may be of interest, as the procedure is probably more or less identical at other fishing stations.

Two long arms of net are moored on shore and extended, the western, in a northerly direction for a distance of about 1¼ miles, where it joins an island at which the actual capture of the fish takes place; this net, known as the "Coda" or tail, is prolonged from the island, for a further distance of rather more than a mile in nearly the same direction, but inclining somewhat to the east, and is known as the "Coda Alta" or upper tail, and its end terminates in three sides of a square named the "Campile."

The eastern net has a north-east direction from the shore for nearly 1½ miles, is named the "Costa," and ends in a similar "Campile"; its object is to prolong the natural coast line, and these two arms circumscribe the expanse of water in which the tunny are moving, and serve to indicate the direction they are to follow to the tunnery.

The nets, from 100 to 130 feet in depth, are held in position by a special system of mooring lines, the upper part of the net being attached, by vertical lines, to a hawser, known as the "sommo," which is secured by anchors at suitable intervals, and kept afloat by bundles of corks; another hawser, named the "piombo," is attached at the lower side of the net, and weighted by large pieces of stone. These nets act as guides to direct the passage of the fish, who seldom attempt to pierce them.

The tunnery proper is divided into several chambers, closed or opened by raising or lowering net coverings, and as boats are constantly on the look-out for the fish, watchmen, by means of the net coverings, allow the fish to pass through the various chambers, until they reach the last, or chamber of death, which being made of close and heavy hemp netting, and with a bottom, is hauled over a pontoon, thus obliging the fish to come to the surface, when they are despatched by gaffs, fastened to the ends of short poles. A single fish sometimes

Chart 2158a, Mediterranean sea, western sheet.

weighs nearly 1,000 lbs., and they generally take six men to haul them on board; they are cut up, boiled in copper vats, the cooked pieces being afterwards tinned and covered with olive oil.

Marks for tunny nets. — On the coasts of Tunis the tunny nets are marked uniformly in the following manner:—

On shore.—Beacons 10 feet in height, made of wood or iron and surmounted by two spherical topmarks, one white the other red, mark the shore limits of the area containing the nets.

At sea.—Buoys, surmounted by a white ball over a red ball, mark the limits of the area occupied by the nets, corresponding to the beacons on shore.

The seaward extremity of the nets are marked by a lightboat, with one mast, 16 feet in height, showing by day a white ball over a red ball, and at night *two fixed* lights, *placed vertically*, 6 feet apart, the upper *white* and the lower *red*.

At the tunny fisheries, established off the coasts of Spain, Africa, and the Balearic islands, under Spanish jurisdiction, each tunny net, when submerged, will be distinguished by the undermentioned flags or lights:—

By day.—A white flag, with a black "A" in its centre, hoisted over the centre of the net; and a similar flag at its outer extremity.

By night.—Two vertical *red* lights, 5 feet apart, visible from a distance of 2 miles, and hoisted on the fishery ship; also a *red* light hoisted above a *white* light at the outer extremity of the tunny net.

At Malta each seaward extremity of the nets is marked by a nun buoy surmounted by a staff and ball during the day, and at night by a boat showing two *fixed white* lights, placed vertically, which in clear weather should be seen from a distance of 2 miles.

In Sicily and Sardinia the nets are marked by day with buoys, boats, or floating beacons; and by night with the same showing one or two lights, and sometimes a light with three colours. The various marks are described at the different places in the book.

The northern territorial limit of the tunny fishery between Sardinia and Corsica is marked by a line drawn through a beacon on Guardia del Turco, at the north extreme of Isola della Maddalena and a beacon on the southern point of Isola Budelli.

The western limit is marked by a line drawn through a beacon on the old semaphore of Contra di li Scale, at the northern end of Sardinia, and a beacon on Punta Marmorata.

These beacons are of masonry and painted white.

CAUTION. — Apart from the damage that may be done to the nets, should a vessel pass through them, they are generally of such a strength, that, should a vessel's propeller become fouled, the vessel might become unmanageable.

Charts 1077 and 1078.

PASSAGES. — England to Gibraltar. — Steam vessels.—As direct as possible. Pass about 10 miles outside Ushant and Cape Finisterre, but much further off in thick or heavy weather. In shaping a course for Cape Finisterre, attention must be paid to the easterly current, from the Atlantic, which usually sets directly on to that part of the coast. Thence the course is along the coasts of Spain and Portugal, passing outside the Burlings, and giving them a wide berth at night,* or in thick weather, and continuing along the coast of Portugal as far as Cape St. Vincent, steer for Gibraltar strait. In thick weather a vessel's safety may be assured by sounding on the bank extending off Cape Trafalgar for some distance.

Sailing vessels. — A vessel on leaving the English channel, should at once make westing, as the prevailing winds are from that direction.

With a fair wind, from the Lizard, a W.S.W. course should be steered to gain an offing in long. 10° or 12° W.

With the wind from the westward, the vessel should be hauled to the wind on the tack which will best enable her to approach her proper course without being drawn into the Bay of Biscay, which is especially to be avoided. Rather than run any risk of this, it will be better to make a long board to the westward, and since westerly winds generally alter to north-west, if a good offing has been made, the course can afterwards be pursued a point or two free, making allowance for a south-easterly set.

A vessel from Liverpool would pass north or south of Ireland, as most convenient, considering the direction of the wind on starting.

From long. 10° or 12° W., or as soon as a good offing has been obtained, a course should be shaped for Madeira, giving a wide berth to Cape Finisterre in passing it, as the current from the Atlantic usually sets right on-shore there, and continue down the coast as far as Cape St. Vincent, and thence shape a course for Gibraltar strait.

If a vessel be driven into the Bay of Biscay, refuge may be found in Ferrol, Coruña, Barquero, or Vivero; or in extreme cases the ports and roadsteads of France, from the Gironde to Brest, &c., are open and safe.

With the wind from N.W., through North, to N.E., make Cape Trafalgar; with it from West, through South, to East, make Cape Spartel.

In thick weather the safety of the vessel may be assured by making the bank of soundings which extends about 20 miles from the coast abreast Cape Trafalgar, but care must be taken, on nearing Tarifa point, to avoid the Cabezos shoals.

* At present many of the Spanish lights are placed so high as to be frequently obscured by mist.

Charts 1077 and 1078.

If an easterly wind be met, and it is too strong to beat against, shelter will be found under Cape Spartel, the vessel either keeping under weigh, or anchoring in Jeremias anchorage, about 3 miles southward of the cape.

CAUTION.—In crossing the Bay of Biscay due allowance should be made both for the outset and indraft, but especially the latter, when standing southward during thick weather for a position westward of Cape Finisterre.

Between the years 1897 and 1906, both inclusive, five vessels, bound south-westward, were wrecked in the vicinity of Cape Villano, on the southern side of the Bay of Biscay, and seven vessels, bound north-eastward, on Ushant or the rocks near it, on the northern side of the bay. Although this is a small number out of the many vessels crossing the bay, these disasters might have been prevented with proper caution.

The wrecks occurred from two causes:—

1. A strong easterly set while crossing the bay.
2. The neglect to obtain frequent observations so that the set could be known and allowed for.

With regard to 1, it is well known that when crossing any bay with an on-shore wind and beam swell, there is always a set in, more or less, towards the shore, and although this inshore set has a tendency to run along the shore of the bay and out off the salient points at each end, or perhaps only at one end, it must be borne in mind that the outward set, although its rate may be considerable, is a narrow belt crossed in a short space of time, whereas the set experienced in crossing the bay may have affected the vessel for many hours.

These general facts are intensified in the Bay of Biscay, where the Atlantic swell constantly sets in and the prevailing wind is towards the shore; moreover, the off-set from the bay is confined to its northern end, for at its southern end the current more usually sets eastward along the north coast of Spain. A considerable easterly set may therefore be always expected when crossing the bay, either north-eastward or south-westward, and the only outset is a narrow stream current at the northern end by the Chaussée de Sein.

With clear weather and sky, and a good horizon, the effect of any set upon a vessel can be readily ascertained by obtaining frequent astronomical observations, more especially those of stars at morning and evening twilight, when both latitude and longitude can be found accurately. But in thick weather, when astronomical observations cannot be obtained, it is folly to attempt to round either Ushant or Cape Finisterre at distances of less than 30 or 40 miles, for the on-shore winds bring cloud, that develops into fog or thick mist when it reaches the elevated land at each end of the bay, and then the fog

Charts 1077 and 1078.

signals are not heard against the wind. Besides, little is gained by rounding Ushant at a distance of 10 miles instead of 40 miles. It is hoped that, with proper consideration of the above facts, shipwrecks at either end of the bay will cease to occur.

The coast between Capes Ortegal and Finisterre is dangerous to approach at night, especially in winter, or in thick and foggy weather, which is frequent there, for not only does a strong current at times set eastward towards the land, but the tidal streams often affect the position. In the dark gloomy weather of winter the high land is often obscured, but the beaches at the foot of the hills and off-lying islets or rocks may sometimes then be seen. Unless absolutely certain of the position, a very wide berth should be given to this coast at night, or in thick weather.

Many of the lights are placed so high as frequently to be obscured by mist and thus give no warning.

There is a most valuable bank of soundings fronting the whole coast, on which depths decrease so gradually, as the land is approached, that the distance from it can be told with considerable accuracy by the lead. The depths on the bank, however, are such that unless soundings are taken continuously, and a depth of at least 70 fathoms reached at each cast, brief warning may be given.

The 100-fathoms line passes 11 miles from Cape Ortegal and 10 miles from Cape Finisterre.

Between Capes Roca and Espichel the indraught of the Tagus on the flood must be guarded against.

When approaching Cape Finisterre, especially from ports of the United Kingdom, every opportunity should be taken to ascertain the deviation of the compass, one of the unsuspected causes of vessels being in dangerous proximity to the land in thick weather being doubtless due to the disregard of these necessary observations.

The deviation should also be ascertained on approaching the entrance of the English channel when homeward bound.

In going through the Strait of Gibraltar keep in mid-channel, as the current is nearly always setting to the eastward there. Along the shores tidal streams are developed which run west with a rising tide, and east with a falling tide. The easterly current in the middle is rarely overcome by the westerly stream, but during easterly winds and calms it is always retarded and occasionally reversed.

Gibraltar to England.—Full-powered steam routes.—The reverse of the outward route.

Low-powered steam and sailing routes.—A low-powered steam vessel should leave Gibraltar at low water and steam through the strait.

Charts 1077 and 1078.

It is almost impossible for large vessels to beat through Gibraltar strait to the westward, as the easterly current is increased by westerly winds. Some instances are known of vessels of war having achieved it, but these cases, favoured by circumstances, are rare. Small vessels can do it by working along shore during the rising tide, and anchoring during the falling tide.

When through the narrows there is less current and a more manageable wind.

After passing Cape St. Vincent a vessel should stand out to the north-westward with the prevailing northerly winds until she meets a favourable wind. She should get an offing of at least 100 or 150 miles to avoid the south and south-easterly current near the coast of Portugal.

If a southerly wind should be met with, the vessel should stand to the northward, keeping a moderate distance from the land.

Gibraltar to Malta and back.—Steam vessels.— Direct to Cap Caxine and thence along the African coast, passing south of the Sorelle rocks and Galita island, towards Cap Bon. Thence north of Pantellaria and Gozo.

In the reverse route, pass north of Galita, and thence towards and along the Spanish coast from Cape de Gata to avoid the adverse currents.

Sailing vessels.—Summer (May to September).—Keep in the middle of the channel until abreast of Cape de Gata, and thence along the African coast as far as Cap Bon to profit by the easterly current, passing north of Galita island. Thence proceed direct for Malta, passing north or south of Pantellaria and the Maltese islands according to circumstances.

In winter (October to April).—Westerly winds (S.W. to N.W.) principally prevail, and vessels should then keep along the coast of Spain as far as Cape Palos, and thence steer for the south coast of Sardinia. Under all circumstances the African coast should be avoided in the winter, as the northerly gales make it a dangerous lee shore. From south of Sardinia make for Cap Bon, and pass north of Pantellaria and Gozo. With a strong S.W. wind, however, vessels may keep the African coast as far as Cap Bon.

If leaving Gibraltar, with an easterly wind, work to windward in mid-channel as far as Cape Palos, and to the south end of Sardinia. Thence make for Cap Bon, and pass north or south of Pantellaria and the Maltese islands according to circumstances.

In the return voyage, from Malta to Gibraltar, with a fair wind, after passing Cani rocks, keep well off the African

Charts 1077 and 1078.

coast to avoid the easterlyc urrent, and make the Spanish coast about Cape Palos, afterwards keeping along it to Gibraltar.

Great care is requisite in making Gibraltar strait in the thick weather which usually accompanies easterly winds, as vessels mistaking the Rock of Gibraltar for Sierra Bullones (Apes' hill) and supposing they were passing through the strait and vice versâ, have been wrecked in Mala and Tetuan bays, where the land is low.

With north-westerly winds vessels should work along the coast of Sicily to Maritimo, taking care to avoid the Graham shoal with 15 feet water over it, which lies about 23 miles from the shore abreast Capo San Marco; and then work across to the south coast of Sardinia and the south coast of Spain. The difficulty of getting to windward with a westerly wind increases as the Strait of Gibraltar is approached, vessels being frequently obliged to remain some days at anchor on the coast. Short tacks should be made along the Spanish coast to avoid the easterly current in mid-channel.

If a north-westerly gale be encountered between Malta and Pantellaria, it is better to put back to Malta rather than risk straining the ship in the heavy sea then met in that channel.

Another route, and recommended as a better one, is, on leaving Malta, to stand on the starboard tack towards the coast of Africa, and work along it up to Cap Bon, and thence, as before, keeping well off the coast of Africa.

Gibraltar to Sardinia, Naples, or Sicily, and back. —Steam vessels.—Keep well off the Spanish coast till abreast of Cape de Gata, so as to profit by the easterly current, and, if bound to Naples or Sardinia, steer direct for the south end of that island, or, if bound to Sicily, direct for its north side, giving the Keith reef a wide berth.

In returning keep along the coast of Spain from Cape de Gata.

Sailing vessels.—Summer.—With a fair wind pass between Alboran island and the coast of Spain (about 30 miles distant), and midway between the Balearic islands and the coast of Africa, along the south coast of Sardinia, and north or south of Sicily according to the port bound to.

With an easterly wind work to windward in mid-channel, and then between the Balearic islands and the coast of Africa, keeping nearer the coast of Africa with the wind to the southward of East, but nearer the islands with the wind to the northward of East.

Winter. — Keep along the coast of Spain as far as Cape Palos, and thence make for the south end of Sardinia, and pass north or south of Sicily.

The opposite route in both seasons is to pass along the south coasts

Charts 1077 and 1078.

of Sardinia and the Balearic islands, and keep along the coast of Spain from Cape Palos.

Between Gibraltar and the Gulfs of Lyons and Genoa.—Steam vessels.—Keep about 20 miles off the coast of Spain up to Cape San Antonio, and thence direct.

In returning the route is direct to Cape San Antonio, and close along the coast of Spain.

Chart 1078.

Sailing vessels. — Keep in the middle of the channel whether the wind be from the eastward or westward.

In summer, pass through the Majorca channel, and if bound to Marseille sight Capes Sebastian or Creus before crossing the Gulf of Lyons; but **if bound to the Gulf of Genoa,** make the land about the Hyéres islands. In most cases, bound to Genoa or Leghorn, the sooner the coast of Provence is made, the more secure the voyage, unless the wind should be settled from S.E. to S.W.

In winter. — Keep along the coast of Spain up to Cape Creus, where shelter may be obtained in Rosas bay in case of a northerly gale or bad weather, and thence, **if bound to Marseille,** stand across the Gulf of Lyons and pass well to the westward of Planier island, but in case of a south-east wind endeavour to make easting as quickly as possible as far as long. 5° E. **If bound to the Gulf of Genoa,** make the Hyéres islands.

Sailing vessels rounding Cap Corso, the north end of Corsica, in the winter, should give it a berth of 6 or 8 miles, as within that distance dangerous whirlwinds and squalls come off from the cape.

In approaching the northern shore of the Gulf of Lyons, with southerly winds, the greatest caution is necessary, as the currents with these winds set strongly to the northward and north-westward, and many vessels have been wrecked.

On the return voyage vessels should make for Cape San Antonio, and then keep along the coast of Spain.

CHAPTER II.

THE STRAIT OF GIBRALTAR; AND THE COAST OF SPAIN FROM EUROPA POINT TO CAPE PALOS.

(*Lat. 37° 40′ N. to Lat. 35° 40′ N.*)
(*Long. 6° 10′ W. to Long. 0° 40′ W.*)
Variation decreasing about 6′ annually.

Chart 142, Strait of Gibraltar. Var. 14° 50′ W.

STRAIT OF GIBRALTAR. — The Strait of Gibraltar, the Fretum Herculeum of the ancients, is known to the Arabs as Bab-ez-Zakak, or the gate of the narrow pass, and as "the Gut" to our seamen and pilots. It derives its present name from Jebel Tarik, a name which was given to Monte Calpe by Tarik-ben-Zayde, when he landed in Spain, 710 A.D. It is bounded on the north by the coast of Spain included between Cape Trafalgar and Europa point, on the south by the coast of Marocco between Cape Spartel and Ceuta; and is about 32 miles in length, its central direction being nearly east and west.

The breadth of the strait, between Capes Trafalgar and Spartel (the western entrance points), is 24 miles; between Europa point and Almina point (Ceuta), 12½ miles; and between Tarifa and Alcazar point, 9⅓ miles. The narrowest part of the strait is between the Points Canales and Cires (7¾ miles).

CAPE TRAFALGAR, named by the Romans, Promontorium Junonis, and by the Arabs Taraf el agar (promontory of caves), forms the northern limit of the western entrance to Gibraltar strait, is a small sandy peninsula scarcely 50 feet above high water. The isthmus, which unites the peninsula to the continent, is also low and sandy, so that the cape appears at a short distance from the north-west or south-east, like an island.

High tableland, divided in two, rises abruptly at a short distance eastward of the cape, and extends to Patria hills, which reach an elevation of 625 feet above high water at 4 miles eastward of Conil.

LIGHT (*Lat. 36° 11′ N., Long. 6° 2′ W.*). — The lighthouse on Cape Trafalgar is a white and red conical tower, 113 feet in height; it exhibits, at an elevation of 170 feet above high water, a *fixed* and *flashing white* light *every thirty seconds*, which is visible in clear

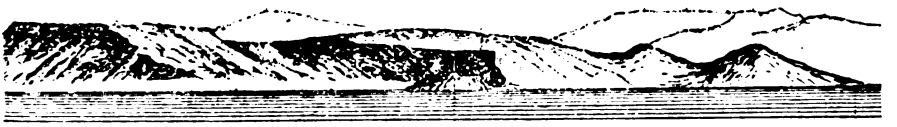
General charts 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 50′ W.

weather, the *fixed* from a distance of 14 miles, and the *flashing* 19 miles. The lighthouse is joined to the keepers' dwellings.

Meca hills, or Altos de Meca, is the name given to a level ridge 558 feet above high water, apparently divided in two by a plain and running from north-east to south-west, which rises almost abruptly eastward of the cape at a short distance from it, and extends to Patria hills. On its western part, and about 1¼ miles 57° true from Cape Trafalgar lighthouse, is the round white and conspicuous tower of Meca, 570 feet above high water.

The site on which the tower stands, in whatever direction it may be seen from seaward, presents almost always the same appearance; its colour is dark, and on its northern part there are some sandy patches which contrast well with the green hue of the surrounding land.



From Torre de Meca the tableland trends in the direction of Brena or Torre Tajo, declining gently on approaching the sea, where it terminates abruptly in a steep cliff, the whiteness of which is remarkable. *See* view on chart. The tableland formed by Altos de Meca extends also to the north for some distance, and preserving an almost uniform height as far as the town of Vejer.

Vejer town had in 1900, 11,298 inhabitants, and is situated 5½ miles north-eastward from Cape Trafalgar. The town being hidden behind the high lands of Meca and Patria, can only be seen from Barbate bay, but the windmills on a hill, 722 feet above high water, a short distance south-west of the town are visible from other directions.

Tides. — It is high water at full and change, near Conil (6 miles northward), at Ih. 18m.; springs rise 12 feet, and neaps 7½ feet.

La Aceitera (*Lat. 36° 11′ N., Long. 6° 4′ W.*), a rocky and dangerous shoal, lies on the west side of Cape Trafalgar, and is 1½ miles in length, north-west and south-east, with from 3 to 27 feet water, over rocky bottom. From the depth of 5 fathoms, at its north extreme, the lighthouse on Cape Trafalgar bears 85° true, distance 1$\frac{8}{10}$ miles; and from a depth of 5 fathoms on its south extreme, the lighthouse bears about 41° true, distant 1$\frac{9}{10}$ miles.

The shoalest part of La Aceitera is connected with Cape Trafalgar

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 50′ W.

by a rocky ridge about a quarter of a mile wide, over which are patches named the Piles, with 2¼ fathoms water over it, and Requin reef, with a depth of 1½ fathoms, both situated about 1¼ miles from the lighthouse; Animas rocks, with one fathom water over them, are about half a mile from the lighthouse. Lighthouse rock, with a depth of 2 fathoms over it lies about 6 cables from the lighthouse. A patch of 4¾ fathoms lies half a mile southward of the cape. No vessel should pass between La Aceitera and the cape, as over the rocky ridge there is a race about half a mile in extent, caused by the unevenness of the ground and the effect of counter streams, and there may be rocks as yet unknown. *See* also Tide races, page 57.

The northern limit of Barbate light *white* sector shows over the southern extreme (4¾ fathoms) of La Aceitera.

Placer de Meca, rocky, and covered with a slight layer of sand, with from 2½ to 5 fathoms water over it, extends 1¼ miles in a north-north-west and south-south-east direction. From the north-west end in a depth of 5 fathoms, Cape Trafalgar lighthouse is in line with Torre Tajo, bearing 94° true, distant 3¾ miles; and from the south-east end, the lighthouse bears 78° true, distant 2$\frac{8}{10}$ miles. The sea rises on this bank, and when it is heavy, often breaks.

Trafalgar or Phare bank (*Lat. 36° 8′ N., Long. 6° 7′ W.*), to the south-west of Placer de Meca, is a rocky patch, on which are from 7 to 10 fathoms water. From its centre the lighthouse is in line with Torre Meca, bearing 56° true, distant 4$\frac{8}{10}$ miles.

Vessels should not pass over this bank in heavy weather, as the sea rises on it; at such times the water, in this vicinity, acquires a yellowish colour, as the bottom around the patch consists of rock and sand.

There is a depth of 8 fathoms about 1¾ miles 220° true from the western extreme of the bank, where the *Martos* sank.

Chart 92, Cape St. Vincent to Strait of Gibraltar.

Little Phare or Hoyo bank lies 247° true, distant 15 miles from the cape, and is a small shoal on which is a depth of 9 fathoms, over rock covered with sand, with 12 to 26 fathoms round it. The bank should be avoided in heavy weather, as it may then break. The 100-fathoms contour line passes 6 miles south-westward of it. A patch of 10 fathoms, sand, lies about 1½ miles southward of Little Phare bank.

Chart 142, Strait of Gibraltar.

A patch of 10 fathoms water, with depths of 14 and 20 fathoms around, lies 173° true distant 2¾ miles from Cape Trafalgar lighthouse, and another patch with the same depth lies the same distance 126° true from the lighthouse.

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 50′ W.

Torre Brena or **Tajo.**—From Cape Trafalgar, the coast trends in an easterly direction with a slight bend to the northward, forming a bay with a sandy beach, which terminates in cliffs on which, at 3 miles from the cape, is Torre Tajo, 150 feet above high water. *See* view on chart.

Nearly midway between the cape and the tower, there is a small white guard-house visible from some distance; and off the house, at 2 to 3 cables distant, is a reef named the Cañaveral, which, uncovering at low water, protects the little cove of Varadero de Meca, where there is convenient landing.

Anchorages. — Vessels may anchor, with northerly winds, in 8 or 9 fathoms water, or any convenient depth, sheltered from the north-west swell off the Varadero de Meca, with a break or cut in the heights of Meca bearing 30° true and the south extreme of the cliffs, on which is Torre Tajo, about 101° true; the nature of the bottom should be ascertained before anchoring, as some ridges of rock exist.

Barbate bay.—At 3 miles eastward of Torre Tajo is the mouth of the Rio Barbate, and 1¼ miles farther on is a coastguard house; the bay between, about a mile deep, is named Barbate. From the tower the land becomes lower, and changes to sandy ground, as the mouth of the river is neared; the cliffs under the tower are cleared of danger and steep-to, with a depth of 4½ fathoms for nearly half a mile seaward, but from a little beyond it to the mouth of the river, reefs extend off about half a mile; and at three-quarters of a mile off the coast-guard house, in the eastern part of the bay, is Zahara bank with 3¾ fathoms water on it.

The Rio Barbate, after winding through a deep valley, falls into the sea between low sandy banks; there are 3¼ feet over the bar at low water, but at high tide the banks at the entrance are overflowed, when its mouth appears wide. The village of the same name (with about 250 inhabitants) stands on the right bank, about three-quarters of a mile from the entrance. Between the cultivated land east of the Torre Tajo and the sterile sand tracks near the river, is a large patch of white sandy ground, known as the Picacho de Barbate, which is conspicuous, and serves as a mark for the Cabezos shoals. *See* view, page 84.

Light (*Lat. 36° 11′ N., Long. 5° 56′ W.*).—Near the ruins of Barbate castle, from a gibbet, 30 feet above the ground, over an iron lattice-work turret with a white house at the base, is exhibited, at an elevation of 56 feet above the sea, a *fixed* light, showing *white* and *red* sectors, visible from distances of 8 miles and 6 miles, respectively. For sectors, *see* Light list and chart.

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 50′ W.

Tunny fishery. — Tunny nets are laid out during the season, 1st February to 30th October, about three-quarters of a mile off the shore of Barbate bay. For Lights, marks, and caution, *see* pages 73, 74.

Anchorage. — Coasting vessels either ground on the mud or anchor in the river on its western shore, off the houses, in 3 to 5 feet water; but those unable to cross the bar, anchor in any convenient depth, southward of it, where they ride safely with northerly winds, but this anchorage is not safe, should the wind blow from seaward.

Depths off-shore. — Between Cape Trafalgar and Torre Tajo the soundings are irregular, there being rocky patches of 9 and 10 fathoms, with 12 and 20 fathoms, over sand, between, at 1½ and 3 miles off-shore.

Coast. — From the mouth of the Rio Barbate, the coast is low and sandy, and trends to the south-eastward for 6½ miles to Cape Plata, and at 4½ miles are the tower and village of Zahara, with about 370 inhabitants; Zahara point is of moderate height, and has a tower on its summit; it terminates in a low shore, off which shoal water extends for about a third of a mile.

Mount Retin, a hill of an irregular form with several peaks, is seen at some distance, and then appears like a bold headland having on its slope two large ruined towers; it rises about 1½ miles northward of Zahara point. On the east side of the hill the land is level, and a small stream runs into the sea between its foot and Zahara village; the stream flows from the Lago de la Janda, an extensive sheet of water lying nearly parallel with the coast at about 3 miles from it. *See* view facing page.

Tunny fisheries.—Tunny nets are laid out during the season, 1st February to 30th October, about half a mile from the coast of Zahara, south of the mouth of the small stream mentioned above; also 3 cables south-west of Torre Gracia. For Lights, marks, and caution, *see* page 73.

Cape Plata (*Lat. 36° 6′ N., Long. 5° 50′ W.*) (*see* view facing page) is high, but it appears low from the near vicinity of the Sierra Plata, from which it descends; it has, on its summit, a square tower, below which there is a coastguard station. A reef extends 2 cables from the point, some of the rocks of which are high and remarkable.

Anchorage.—Zahara bay lies between Zahara village and Cape Plata; the bottom is sandy, but not clear of rocks, and here vessels will find shelter from strong easterly winds. The best anchorage is westward of, and at a short distance from, Cape Plata, but heavy squalls come over the land.

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

Mount Retin. *Zahara, bearing 28° true, distant 6¼ miles* *Cape Plata.* *Gracia tower. Sierra Plata.*

Cape Trafalgar lighthouse. *Meca hills.* *Picacho de Barbate.* *Gracia tower, bearing 40° true, distant 9¼ miles.* *Camarinal point.*

Picacho de San Bartolomé. *Paloma point, bearing 357° true, distant 3 miles. Sierra San Bartolomé.* *Val de Vaqueros bay.* *Sierra Enmedio.*

Picacho de San Bartolomé. *Paloma point. Sierra Enmedio.* *Val de Vaqueros bay.* *Pena point, bearing 72° true, distant 6 miles.*

Chart 142, Strait of Gibraltar. Var. 14° 40′ W.

In front of the sandy beach northward of Cape Plata, there are rocky patches close to the shore, outside of which the holding ground is indifferent. Coasters also find shelter, from easterly winds, off a small beach between Camarinal point and Cape Plata. These anchorages are exposed to winds from the south-west, and partly from the north-west, and must be left immediately the Levanter, or easterly wind subsides.

Camarinal point (*see* view, page 84), 2¼ miles southward of Cape Plata, is low, salient, and fringed with rocks extending for a distance of a quarter of a mile; it is backed, as is also the point north of it, by the Sierra Plata, the north-western hills of which rise from the level land of Zahara. The sandy beach, between Cape Plata and Camarinal point, is divided, near its middle, into two parts by a high spur from the sierra, and a rocky ledge extends from it. On the point, formed by this spur, is Gracia tower, circular, and with a coastguard station near it.

The steep ridge of the sierra rises to a height of 1,567 feet above high water, at a distance of 3 miles from Gracia tower, and is named Silla del Papa or the Pope's chair. *See* view, page 81.

From Camarinal point on the west, an extensive white sandy patch extends across the foot of the mountain to Bolonia bay, and is seen at some distance from seaward. From this mountain, the land eastward is of considerable elevation all along the north shore of the strait.

Bolonia bay, on the east side of Camarinal point, is about three-quarters of a mile deep; it has a sandy beach, and at its head is the small village of the same name, with a church, some farm buildings, and a coastguard station; the ruins of the ancient town of Belon are on the shore a little to the eastward.

A shoal head with 4¼ fathoms over it lies in the middle of the bay, about three-quarters of a milé eastward of Camarinal point.

Anchorage.—The bay offers good shelter from winds from N.W. (round northward) to East, in moderate depths, at about 4 cables from the shore; the nature of the bottom, which in some places is rocky, should be ascertained before anchoring.

Tunny fishery. — Tunny nets are laid out during the season, 1st February to 30th October, in the eastern part of Bolonia bay. For Lights, marks, and caution, *see* page 73.

Paloma point is salient and well defined, with some rocks extending about 3 cables seaward from it.

LIGHT (*Lat. 36° 4′ N., Long. 5° 44′ W.*).—A white building, about 16 feet in height, situated 2½ cables from the extremity of Paloma point, exhibits, at an elevation of 147 feet above high water,

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 40′ W.

an *occulting white* light *every five seconds*, which is visible, in clear weather, from a distance of 9 miles over a sector covering the Cabezos shoals; the light shows *fixed* for a short distance on either side of this sector, for limits of which *see* Light list and chart.

Sierra San Bartolomé.—The land between Bolonia bay and Paloma point is somewhat elevated, and forms Sierra San Bartolomé, terminating in several peaks, one of which attains the height of 1,542 feet above high water, and descends to Paloma point. Sierra San Bartolomé is conspicuous from its peculiar jagged summit, and by a long patch of yellow sand without vegetation, which commences near Paloma point, rises to about half-way up the mountain, and terminates near the middle of Val de Vaqueros bay. It is known as the Picacho de San Bartolomé, and is one of the most remarkable features seen anywhere on the north shore of the strait. *See* views, page 84.

Val de Vaqueros bay.—Between Paloma point and Peña point east of it, the coast recedes northward and forms Val de Vaqueros bay, which is about half a mile deep. Coasters find sheltered anchorage here from north-easterly winds, anchoring near the beach at the head of the bay, where the holding ground is good.

The little river Val de Vaqueros, on the eastern entrance point of which are a few houses and a coastguard station, descends through the valley, formed between Sierra San Bartolomé and Sierra Enmedio, and falls into the bay about 1½ miles eastward of Paloma point.

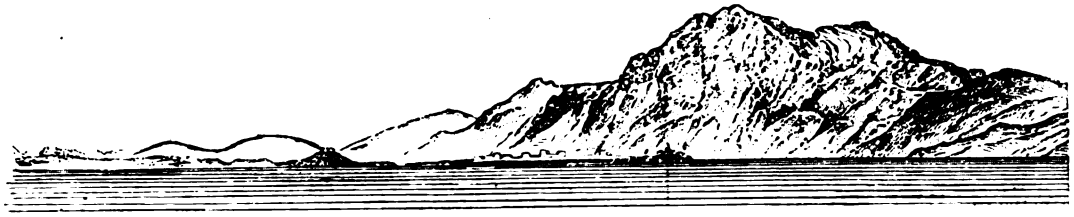
Sierra Enmedio.—Eastward of Sierra San Bartolomé is a similar mountain, named the Sierra Enmedio, 2,191 feet above high water, not so broken or remarkable, but more isolated; from the westward some small peaks appear a little above the main body of the mountain. The Sierra Enmedio, known also as Peña, slopes in declivities to the south, and forms Peña point, which terminates abruptly in a pointed, jagged, and apparently isolated rock, on which is a tower reached by the ascent of 84 steps. Seen from the westward, the tower and rock appear to be detached, and stand out in bold relief from the high land. *See* view facing page, and page 84.

Sierra Nuestra Señora de la Luz (*Lat. 36° 7′ N., Long. 5° 40′ W.*).—North-east of the Sierra Enmedio is the lofty chain of mountains named Nuestra Señora de la Luz, which declines gradually to the coast and terminates at Tarifa. The chapel of Nuestra Señora (our lady of light) is situated on the slope, and most northern part of Salado plain. The summit of this range is moderately even, and presents nothing remarkable, with the exception of two peaks near each other which are 7 miles inland, 2,257 feet above high water,

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

To face page 86.]

Sierra Enmedio. *Las Tetas.* *Pena point, bearing 48° true, distant 3½ miles.* *Sierra Nuestra Señora de la Luz.*



Ceuta. *Santa Catalina fort.* *Sierra Bullones, open of Tarifa peninsula, bearing 121° true.*

Leading mark, Cabezos shoals.

San Roque. *Europa point, Gibraltar, bearing 360° true, distant 9 miles.*

Tarifa lighthouse, bearing 96° true, distant 7 miles. *El Hacho.* *Sierra Bullones.*

Strait of Gibraltar from the westward.

Chart 142, Strait of Gibraltar. Var. 14° 40′ W.

an *occulting white* light *every five seconds*, which is visible, in clear weather, from a distance of 9 miles over a sector covering the Cabezos shoals; the light shows *fixed* for a short distance on either side of this sector, for limits of which *see* Light list and chart.

Sierra San Bartolomé.—The land between Bolonia bay and Paloma point is somewhat elevated, and forms Sierra San Bartolomé, terminating in several peaks, one of which attains the height of 1,542 feet above high water, and descends to Paloma point. Sierra San Bartolomé is conspicuous from its peculiar jagged summit, and by a long patch of yellow sand without vegetation, which commences near Paloma point, rises to about half-way up the mountain, and terminates near the middle of Val de Vaqueros bay. It is known as the Picacho de San Bartolomé, and is one of the most remarkable features seen anywhere on the north shore of the strait. *See* views, page 84.

Val de Vaqueros bay.—Between Paloma point and Peña point east of it, the coast recedes northward and forms Val de Vaqueros bay, which is about half a mile deep. Coasters find sheltered anchorage here from north-easterly winds, anchoring near the beach at the head of the bay, where the holding ground is good.

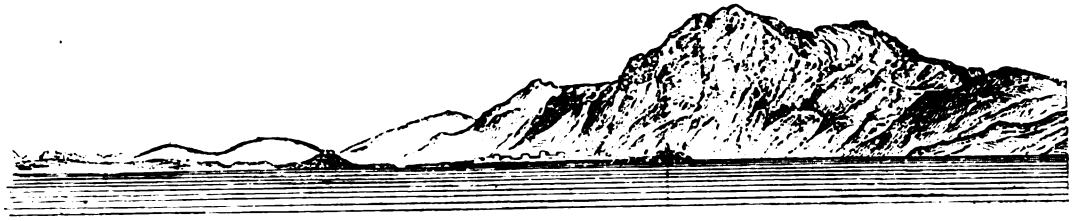
The little river Val de Vaqueros, on the eastern entrance point of which are a few houses and a coastguard station, descends through the valley, formed between Sierra San Bartolomé and Sierra Enmedio, and falls into the bay about 1½ miles eastward of Paloma point.

Sierra Enmedio.—Eastward of Sierra San Bartolomé is a similar mountain, named the Sierra Enmedio, 2,191 feet above high water, not so broken or remarkable, but more isolated; from the westward some small peaks appear a little above the main body of the mountain. The Sierra Enmedio, known also as Peña, slopes in declivities to the south, and forms Peña point, which terminates abruptly in a pointed, jagged, and apparently isolated rock, on which is a tower reached by the ascent of 84 steps. Seen from the westward, the tower and rock appear to be detached, and stand out in bold relief from the high land. *See* view facing page, and page 84.

Sierra Nuestra Señora de la Luz (*Lat. 36° 7′ N., Long. 5° 40′ W.*).—North-east of the Sierra Enmedio is the lofty chain of mountains named Nuestra Señora de la Luz, which declines gradually to the coast and terminates at Tarifa. The chapel of Nuestra Señora (our lady of light) is situated on the slope, and most northern part of Salado plain. The summit of this range is moderately even, and presents nothing remarkable, with the exception of two peaks near each other which are 7 miles inland, 2,257 feet above high water,

To face page 86.]

Sierra Enmedio. *Las Tetas.* *Pena point, bearing 48° true, distant 3½ miles.* *Sierra Nuestra Señora de la Luz.*



Ceuta. *Santa Catalina fort.* *Sierra Bullones, open of Tarifa peninsula, bearing 121° true.*

Leading mark, Cabezos shoals.

San Roque. *Europa point, Gibraltar, bearing 360° true, distant 9 miles.*

Tarifa lighthouse, bearing 96° true, distant 7 miles. *El Hacho.* *Sierra Bullones.*

Strait of Gibraltar from the westward.

Chart 142, Strait of Gibraltar. Var. 14° 40′ W.

and named Las Tetas (the Teats) by the local mariners. *See* view, page 86.

Lances de Tarifa. — The coast from Peña point to Tarifa, a distance of 4 miles, forms a sandy beach named Lances de Tarifa. The little Rivers Salado and Vega here run into the sea; several buildings are scattered along the base of the Sierra Enmedio, and in the plains of Salado, a coastguard house stands close to the sea, about half a mile south-east of Peña tower. A bridge crosses the Salado at a short distance from its mouth.

Tunny fishery. — Tunny nets are laid out during the season, 1st February to 30th October, at the Lances de Tarifa, north-west of Tarifa lighthouse. For Lights, marks, and caution, *see* page 73.

Anchorage, with good holding ground, and sheltered from north-easterly and easterly winds, may be obtained off the Lances de Tarifa, although violent squalls are experienced when these winds are strong; some rocky patches should be avoided, and the anchorage left on the easterly winds subsiding.

Landing may be easily effected on the beach.

Submarine telegraph cable. — A telegraph cable crosses from northward of Tarifa peninsula to Tangier bay.

CABEZOS SHOALS (*Lat. 36° 1′ N., Long. 5° 44′ W.*), which lie southward 2½ miles from Paloma point, and 5 miles from Tarifa lighthouse, are about 2 miles in length east and west and one mile in breadth within the 10-fathoms limit, and comprise two shallow banks, Piedra Verde and Bajeta Poniente. The sea breaks with great violence over these shoals, during strong westerly winds, and in calm or easterly winds there are ripples with dangerous eddies. *See* also Tide race, page 56.

Piedra Verde is a dangerous shelf formed of pointed rocks, with 2 fathoms of water over it, and 4¼ to 8 fathoms close round, it lies 170° true from Paloma point lighthouse.

Bajeta Poniente, the eastern end of which is about 2 cables northward of Piedra Verde, is a reef of pointed rocks, with 3¼ fathoms water over it, extending about 8 cables, east and west, and 2 cables, north and south. It is separated from Piedra Verde by a channel in which the depth is from 6½ to 13 fathoms.

Placer Nuevo or Luyando, small, rocky, and with a depth of 8 fathoms over it, lies about 225° true, distant one mile from Piedra Verde.

The sector of Paloma point light shows over this shoal and Cabezos shoals.

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 40′ W.

Placer del Oeste or del Puerco (*Lat. 36° 2′ N., Long. 5° 45′ W.*), also of rock, with a depth of 9 fathoms on it, lies 213° true distant 2½ miles from Paloma lighthouse, and over a mile north-westward from Bajeta Poniente; in the channel between these shoals the depth is 16 fathoms.

Bajeta de Tierra, a rocky patch, with one fathom least water over it, lies 210° true distant 1¼ miles from Peña point. In south-westerly gales the sea breaks heavily on the shoal, and in fine weather there are strong eddies and ripples over it. There are irregular soundings, of from 3¾ to 4¾ fathoms, between it and the land; and from 6 to 16 fathoms between it and Cabezos shoals.

Directions. — The shoals just described, and which are known collectively as the Cabezos shoals, are separated from each other by deep water; they are steep-to, and a wide berth should be given them. In thick weather the deep sea lead and the chart must be used, if the vessel's position is unknown when in this vicinity.

Steam vessels and coasters, in order to avoid the sea and the strength of easterly winds, when bound westward, and also in working eastward, can use the channel between Bajeta de Tierra and Cabezos shoals, as it is 1½ miles wide with deep water. The leading mark through in mid-channel is Tarifa lighthouse in line with Mount Hacho Fort of Ceuta bearing 112° true; to avoid Bajeta de Tierra, keep Sierra Bullones or Apes hill open of the south-western extreme of Tarifa peninsula, bearing about 121° true (*see* view, page 86); and the north end of Ceuta shut in with the south-western extreme of Tarifa peninsula, leads clear north-eastward of Cabezos shoals.

At night, in clear weather, Tarifa and Ceuta lights in line bearing 111° true lead in deep water between Cabezos and Bajeta de Tierra shoals. Ceuta light has, under favourable conditions, been seen from off Camarinal point.

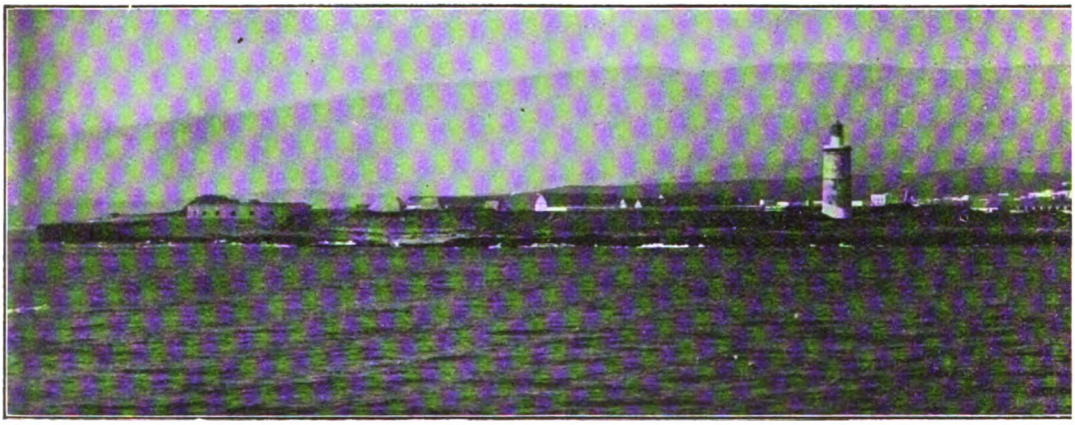
Small vessels also pass between Peña point and Bajeta de Tierra, but this channel is neither so wide nor so deep.

To pass south-westward of Cabezos shoals, keep the Picacho de Barbate (the great white patch east of Tajo cliffs, page 83) well open of Cape Plata, bearing about 323° true, until the peaks of Nuestra Señora de la Luz are open eastward of Peña tower; or do not bring Cape Plata to bear westward of 345° true, until Tarifa lighthouse bears 90° true, which bearings lead westward and southward of the shoals.

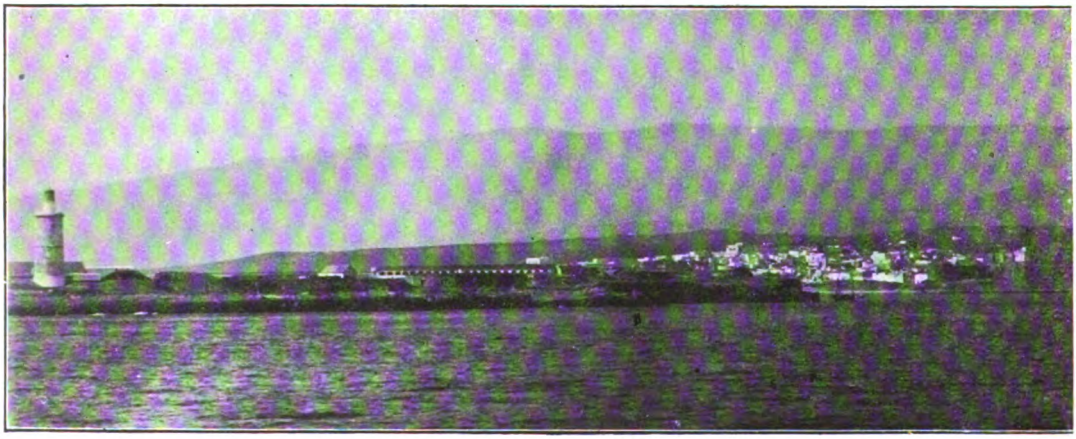
At night, the *red* sector of Tarifa *occulting* light shows over Cabezos shoals, the southern limit passing about 4 cables southward of Placer Nuevo; the shoals are also covered by the *occulting* light on Paloma point.

General charts 773, 92, 2717, 1, 2158a, 1226, 449.

To face page 89.]



Tarifa lighthouse, bearing 6° true, distant half a mile.



Tarifa lighthouse, bearing 340° true, distant half a mile.

Chart 142, Strait of Gibraltar. Var. 14° 30′ W.

TARIFA (*Lat. 36° 0′ N., Long. 5° 37′ W.*), formerly an islet, is now a small peninsula, joined to the mainland by an artificial causeway. It is round, about one-third of a mile in diameter, level, moderately high, and surrounded by steep cliffs with deep water close-to, except on the south-western side, where a reef extends for the distance of a cable; Marroqui rock, which uncovers at low water, lies half a cable from the coast westward of the lighthouse, and a cable from the shore in the same direction, the depth is only 2 fathoms. The lighthouse, some small batteries, barracks, magazines, and other buildings are erected on the peninsula, and on its north-west side there is a small artificial harbour for fishing craft.

LIGHT (*see* views facing page). The lighthouse of Tarifa is a white circular tower, 114 feet in height, standing at the south end of the peninsula. It exhibits, at an elevation of 144 feet above high water, a *group occulting white* light, with *red sector*, showing a *group of three occultations every twenty seconds*, thus:—light, *ten and seven-tenths seconds;* eclipse, *one and a half seconds;* light, *two and four-tenths seconds;* eclipse, *one and a half seconds;* light, *two and four-tenths seconds;* eclipse, *one and a half seconds;* it is visible, in clear weather, the *white* from a distance of about 25 miles, the *red* about 20 miles. For sector and arc of visibility, *see* Light list and charts.

Note.—The distinctive character of the light is the grouping of the occultations, and not the duration of the appearance, or the periods of light and darkness, which may vary slightly.

Bell-buoy.—A bell-buoy lies a distance of 2 cables 208° true from Tarifa point lighthouse.

Lloyd's signal station.—There is a Lloyd's signal station at Tarifa.

Semaphore station.—There is a semaphore station in a house painted black and white in horizontal bands, and situated about one mile eastward of Tarifa lighthouse, near Camorro point. Communications can be made, from sunrise to sunset, by the International code. *See* page 68.

When southerly or south-westerly winds are blowing in the Gulf of Cadiz, a pennant with three blue and two white horizontal stripes is hoisted at the station.

Life-saving apparatus.—There is a rocket apparatus at Tarifa.

CAUTION.—Vessels passing within gunshot of the fortress should show their colours, and by night a light; vessels failing to do so are liable to the risk of being fired at.

Anchorage.—Large vessels will find temporary anchorage at about one-third of a mile from the shore, in from 8 to 10 fathoms water, over sand and gravel; but in the event of the wind shifting to the south-west, when it generally blows hard, this anchorage would be

Chart 142, Strait of Gibraltar. Var. 14° 30′ W.

exposed and a vessel should leave. Less than a mile to the south of Tarifa there is a depth of above 100 fathoms.

Anchorage, sheltered from south-westerly winds, can be obtained by small craft eastward of the causeway between the peninsula and Camorro point and near the beach, for the bottom is shelving, and there is a depth of 5 fathoms at 2 cables from the shore. Coasters, and particularly lateen-rigged vessels that can readily make sail, are the only kind of vessels that can frequent the anchorage with confidence, Camorro point being difficult to clear if the wind should shift to the southward.

There are several rocks on the beach between Camorro point and the town, with from 6 to 9 feet water between them, where small craft can load and discharge cargo.

Town.—The town and arsenal of Tarifa stands about half a mile north-east of the peninsula; it was built by the Moors, and is surrounded by a wall flanked by several towers, the principal of which, at its south-west angle, is named the Castle of Guzman. Its population, including the suburbs, was about 14,000 in 1910. Santa Catalina, a fort on rising ground on the causeway or neck of the peninsula, is surrounded by sand, and appears isolated.

Tarifa has scarcely any commerce, but there are some tanneries and potteries, and anchovy fisheries.

Supplies.—Provisions and water may be obtained.

Tides and tidal streams.—It is high water, full and change, at Tarifa, at Ih. 46m.; springs rise 6 feet, and neaps 3½ feet. The westerly stream commences about 7 hours before high water, and the easterly stream about high water at Tarifa. *See* also Tidal streams, page 55, and Tide races, page 56.

Camorro point (*Lat. 36° 0′ N., Long. 5° 36′ W.*), a mile north-east of the peninsula, is high, steep, has a white appearance, and seen from the westward is readily distinguished; large vessels should give this point a berth of 2 cables. There is a semaphore station westward of the point. *See* previous page.

Coast.—From Camorro point the coast trends eastward for 9 miles to Carnero point, at the entrance to Gibraltar bay. It is generally composed of cliffs separated by sandy beaches, with ledges of rocks which do not extend far off, and backed by gentle undulating hills, upon which are numerous farms and cultivated ground. Behind these hills the land becomes mountainous, with heights of from 1,350 to 2,000 feet above high water, and forming part of the range of Nuestra Señora de la Luz.

Canales point is situated just over 2 miles eastward of Camorro point; it is steep, moderately high, with two small islets but little

Chart 142, Strait of Gibraltar. Var. 14° 30′ W.

detached from it. Westward of the point is a coastguard house, white, with a red roof.

Guadalmesi point (*Lat. 36° 2′ N., Long. 5° 32′ W.*), 4¾ miles from Tarifa lighthouse, is a bold, greyish cliff, with a tower on its summit. Guadalmesi river, a small stream, flows into the sea north-eastward of the point, after passing through a picturesque glen; near its entrance is a village of the same name. Black hill, used as a clearing mark for the Pearl rock, is rather over a mile north-eastward of Torre Guadalmesi.

Water.—Good water may be obtained from the river.

Tolmo bay, with a white sandy beach scattered with rocks, is comprised between Guadalmesi point and Acebuche point nearly 3 miles eastward. A castle in ruins stands upon a hillock nearly a mile from Acebuche point with a coastguard house, the walls of which are painted white and the roof red, situated eastward of it.

Anchorage. — The bay affords good anchorage for small craft with off-shore winds.

Chart 1448, Acebuche point to Chullera point, &c.

Acebuche point is low, projects slightly, but is easily distinguished from the eastward or westward. About a quarter of a mile eastward of it and 1½ cables off-shore, are two rocks, named Dos Hermanas, which always show, and there are other sunken rocks in the vicinity of the point.

Fraile point, nearly a mile beyond Acebuche, is bold, and from it the land rapidly rises to a height of 984 feet above high water; halfway up the hill, and a quarter of a mile westward of the point, is a square tower. Off the point are several rocks, the largest of which from its size and shape resembles a friar, whence the name of the point. Thence to Carnero point, a distance of over 1½ miles, is a succession of small bays, some with beaches, the coast being generally foul with reefs.

Arena cove, a small bight with a beach, lies north-eastward of Fraile point; off its north-eastern point which separates it from a similar bay, are some rocky heads which project more than a cable; it offers shelter to coasters from north-west winds. There is a house (Lower mark) close to the coast, near a stream about 6 cables north-eastward of Fraile point, and another (Upper mark), surrounded by trees, upon the slope of the hill, nearly 4 cables 312° true from Lower mark.

Secreta cove, a small bight between Secreta point and Palomas island, and Parra cove, another bight with a beach, between Secreta and Carnero points, afford shelter to small craft. *See* also Tide races, page 56.

General charts 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 1448, Acebuche point to Chullera point, &c. Var. 14° 30′ W.

Palomas or Pigeon island lies nearly midway between Fraile and Carnero points, and 1½ cables from the shore, is small and low, and nearly connected with the mainland by a rocky ledge, over which is a passage for boats; there are also several rocks extending about 1½ cables off the west end of the island, and shoal water for a cable eastward of it.

CARNERO POINT is a broad projection sloping rapidly towards the south-east, and forms the western entrance to Gibraltar bay; on the summit of a hill, about a quarter of a mile west-north-west of Carnero point, is a square tower, and upon the point a lighthouse.

A reef of rocks fringes the point at the extreme of which, and nearly 1½ cables south-east of the point is Cabrita rock, always above water, and conspicuous above several others which uncover at low water; this point should not be passed closely as the tidal streams set on it. *See* page 104.

LIGHT (*Lat. 36° 4′ N., Long. 5° 26′ W.*). — The lighthouse on Carnero point is a yellow conical tower, with a green lantern, 63 feet in height, situated 100 yards within the point; it exhibits, at an elevation of 138 feet above high water, a *group occulting white* light, showing *four* eclipses *every twenty seconds*, thus:—light, *five and eight-tenths seconds;* eclipse, *one and four-tenths seconds;* light, *five and eight-tenths seconds;* eclipse, *one and four-tenths seconds;* light, *one and four-tenths seconds;* eclipse, *one and four-tenths seconds;* light, *one and four-tenths seconds;* eclipse, *one and four-tenths seconds;* which is visible, in clear weather, from a distance of 5 miles. For arc of visibility, *see* Light list.

PEARL ROCK, lying 5½ cables, 149° true, from Palomas island, is a dangerous rocky shoal formed of pinnacle rocks, with a depth of 8 feet over its shoalest part.

In the passage between Pearl rock and Palomas island the bottom is uneven rocky ground, and the depths from 5 to 8 fathoms. Tarifa lighthouse in line with the extreme of the land westward of Fraile point leads between the rock and the island, but unless it is absolutely necessary, only small vessels should use this passage.

Clearing marks. — Black hill (a conspicuous peak rising over the west side of Tolmo bay, with a white house nearly under it) in line with Acebuche point, bearing 269° true, leads south; and San Garcia point open eastward of Carnero point, bearing 346° true, leads eastward of Pearl rock. *See* views A and B on charts 1448 and 142.

General charts 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 1448, Acebuche point to Chullera point, &c. Var. 14° 30′ W.

At night. — The northern limit of Tarifa *occulting white* light, bearing 255° true, passes about 7 cables southward of Pearl rock. Europa point light shows *red* between the bearings 47° and 70° true, and the southern limit of the *red* sector passes half a mile southward of the rock; the *white* light of Carnero point, bearing 335° true, leads about 6½ cables eastward of the rock. Therefore, in approaching the Pearl rock at night from the westward, which will be indicated by a bearing of Carnero point light, keep Tarifa and Europa point *white* lights in sight until Carnero point light bears 335° true, when steer north-eastward into Gibraltar bay. A vessel from Gibraltar bay should cross the *red* sector and open the *white* light of Europa point before Carnero point light bears 335° true, or before losing sight of Verde island light on about a 325° true bearing, and from the eastward keep Europa point light showing *white*, and Tarifa light in sight; when Carnero point light bears 312° true, a course may be shaped for Tarifa.

CAUTION. — In the neighbourhood of Pearl rock and Carnero point the tidal streams and eddies, which at times attain a rate of 3 knots, run nearly always either north-westward or north-eastward, and consequently carry a vessel navigating seaward of the rock towards them. This part of the coast is therefore dangerous, and many serious accidents have occurred to shipping, so that, in passing the Pearl rock, great caution is required (*see* Tide races, page 56). There are 20 fathoms at 1½ cables south-eastward of the rock, and above 100 fathoms at three-quarters of a mile outside of it.

Submarine telegraph cables. — Two telegraph cables pass inside Pearl rock, and vessels should not anchor there.

GIBRALTAR BAY (*Lat. 36° 8′ N., Long. 5° 24′ W.*).—The entrance to Gibraltar bay is 4 miles in width, between Carnero point and Europa point, and the bay, completely open to the southward, extends northwards for a distance of about 5 miles. Towards the eastern side of the entrance, a vein of deep water, with depths of from 100 to 278 fathoms, extends for 3 miles to the northward into the bay, the banks on each side of it and to the head of the bay having less than 100 fathoms, and the water continues deep to the anchorages close in around the bay.

The land on the west side of the bay is high, being the lofty coast range of mountains which follows the direction of the coast from Tarifa, rising over Carnero point to about 1,000 feet above high water, continuing northward and gradually decreasing in elevation towards the head of the bay.

About 2 miles north-eastward from the head of the bay is the Sierra Carbonera, which rises to 1,025 feet, and a tower on it is 968 feet

Chart 1448, Acebuche point to Chullera point, &c. Var. 14° 30′ W.

above high water; thence the land declines to the Neutral ground, at the termination of which rises the Rock of Gibraltar.

The inner portion of the bay has a sandy beach interrupted by some rocky points, and it receives two rivers of some importance, besides smaller streams.

Getares bay lies between Carnero point and San Garcia point, $1\frac{7}{10}$ miles northward, and is about 7 cables deep. The bay is sandy, and affords shelter from North, through west, to S.S.W., in 9 or 10 fathoms water, over sandy bottom; but it is exposed to winds from other quarters, which send in a heavy sea; vessels should therefore leave directly there is any sign of a levanter. Two small streams run into the bay.

San Garcia point has a ruined tower on it, and is skirted by rocks. Rodeo point, $6\frac{1}{2}$ cables northward, is of moderate height; rocks extend off it for nearly 3 cables.

Plan of Algeciras roads on 1448.

Verde islet, lying about half a mile northward of Rodeo point, and about 4 cables from mainland, is about 30 feet above high water, barren and rocky, partly occupied by fortifications for the defence of Algeciras road, and surrounded at some distance by rocks. These rocks, extending north-easterly and south-westerly, are partly uncovered, and afford some shelter to small vessels anchoring north-westward of the islet.

A breakwater, 1,500 yards long, is being constructed extending northward from Verde islet.

The passage inside the islet has from 3 feet to $2\frac{1}{2}$ fathoms of water, over rocky bottom, and can only be used by those acquainted with it. Shoal water, with a depth of $3\frac{3}{4}$ fathoms, extends nearly $4\frac{1}{2}$ cables north-eastward from Verde islet. Between Carnero point and Verde islet the shore may be approached to distances of 4 or 5 cables, in from 7 to 20 fathoms water.

LIGHT (*Lat. 36° 7′ N., Long. 5° 26′ W.*).—On the southern part of the fortification on Verde islet a *fixed white* light is exhibited from a white tower 29 feet in height, at an elevation of 65 feet above high water, and is visible, in clear weather, from a distance of 9 miles. For arc of visibility, *see* Light list and charts.

Torre Villa vieja is square and stands on a rocky point, half a mile westward of Verde islet.

ALGECIRAS ROADS.—Dangers.—Galera rock, lying three-quarters of a cable northward of the extremity of the railway pier, is level with the surface of the water in two parts, nearly circular, and about 70 yards in diameter; it lies near the end of a shallow spit extending $1\frac{3}{4}$ cables from the shore.

Buoy.—A small white and red conical buoy, with a diamond-shaped topmark, marks the eastern end of Galera rock.

General charts 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Plan of Algeciras roads on 1448. Var. 14° 30′ W.

Shoals.—At one cable 10° true from Galera rock is Galera bank, with 10 feet of water over it, and in the channel between there are depths of from 1¾ to 3¼ fathoms. Verde islet rock, with 2½ fathoms water over it, lies 4 cables northward of Verde islet, with depths of 5 and 6 fathoms around it. Barranco shoal, having a depth of 8 feet, lies 3½ cables 90° true from Fort Santiago.

Short rocky reefs also extend, along the shore, between the town and fort.

Buoy. — A small white and red conical buoy, with a diamond-shaped topmark, marks the northern end of Barranco shoal.

Anchorage (*Lat. 36° 7′ N., Long. 5° 26′ W.*). — The anchorage off Algeciras is sheltered from westerly winds, and has good holding ground. Large vessels anchor in 16 or 17 fathoms water, over muddy bottom, about three-quarters of a mile from the shore, with Fort Santiago bearing 255° and Verde islet lighthouse 188° true. Attention should be paid to keep a clear anchor.

Vessels of moderate size will find a good anchorage at 6 cables from the shore, in 9 or 10 fathoms water, over mud bottom, with Verde islet lighthouse bearing 182° true; Fort Santiago 255° true; and the highest belfry in the town 232° true.

It is desirable to anchor northward rather than southward of this position, as the bottom is more regular and the depth about 11 fathoms, over mud; but vessels should not go north of the parallel of the cemetery, the large white wall of which, extending north and south, is within a moderately high cliff, near the sea, between the fort and Torre Almirante. Small vessels anchor between Verde islet and the Rio Miel; the river has a depth of 3 feet at low water, and at high water and with off-shore winds coasters can enter.

The roadstead of Algeciras is exposed to the south-easterly winds, which send in a considerable sea; vessels should leave when there is any sign of these winds blowing, and proceed either to Mayorga or Gibraltar.

Algeciras town, Al-Jezirah of the Arabs, stands on a hill which rises gradually from the coast to a height of 220 feet, and contained in 1910 an estimated population of 20,000. Rio Miel, on its south side, separates it from a small suburb named Villa vieja (Old town), with which it communicates by means of two bridges. It is an open town, and on its north side, on a steep part of the coast, is Santiago fort. The houses of the Marina, mostly whitened, and the steeple of the principal church, the highest building in the town, are conspicuous.

A British Vice-Consul is resident here.

Pier. — A railway pier extends about 1½ cables in an easterly direction from the south side of Rio Miel entrance; on the north

Plan of Algeciras roads on 1448. Var. 14° 30′ W.

side of the entrance is a short mole, nearly dry at low water. Work for enlarging this mole was commenced in 1913, and dredging operations at the entrance of Rio Miel are in progress.

LIGHT.—A *fixed red* light is shown from the end of the railway pier; it is visible in clear weather from a distance of 6 miles.

Communication. — Steamers run to Tangier and Cadiz three times a week; to and from Gibraltar three times daily, in connection with the trains at Algeciras; and to and from Ceuta daily. There are three trains daily to and from Algeciras and Madrid, and railway communication with Seville and Cadiz; a daily motor service to San Fernando; telegraphic communication with all parts.

Supplies. — The market is well supplied with meat and vegetables. Water may be obtained from Algeciras, but with some difficulty; it can be easily procured from the Rio Palmones.

Trade. — The exports are principally cork, charcoal, and fruits; and the imports coal, chemical manure, cereals, and timber. During the year 1911, the port was entered by 37 steam vessels, of an aggregate tonnage of 38,563 tons.

Life-saving apparatus.—There is a lifeboat and rocket apparatus at Algeciras.

Tides and tidal streams.—It is high water, full and change, at Algeciras at 1h. 49m.; springs rise about 4 feet, and neaps 2½ feet; the stream sets to the northward with a rising tide, to the southward with a falling tide. *See* also Tidal streams, page 55.

Chart 1448, Acebuche point to Chullera point, &c.

Almirante and Pólvora towers.—On a cliff of moderate height, close to the coast about three-quarters of a mile northward of Fort Santiago, is Torre Almirante, round, white, and conspicuous; from the cliffs at the foot of the tower a reef extends, and at 3 cables from the tower the depth is 3¼ fathoms. Inland, three-quarters of a mile from Torre Almirante, and on the slope of another hill, is the square ruined tower of Pólvora, 351 feet above high water, and surrounded by a wall. With these towers in line and near the shore, the bottom is rock and gravel, so that vessels should avoid anchoring with those marks on, or in the vicinity.

Coast.—Between Torre Almirante and Punta Rinconcillo, which is 3 cables further northward, and has a coastguard house, 1½ cables distant on its north side, the shore is skirted by reefs. From the point the coast is low and sandy and continues so round the head of the bay to Gibraltar, excepting at Mirador and Mala points.

Rio Palmones (*Lat. 36° 10′ N., Long. 5° 26′ W.*).—The largest of the rivers falling into Gibraltar bay, situated 1¼ miles to northeastward of Punta Rinconcillo, is so obstructed by sandbanks that boats only can enter. Water can be obtained from wells near the mouth of the river.

General charts 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Chart 1448, Acebuche point to Chullera point, &c. Var. 14° 30′ W.

Torre Entre Rios is square, and stands on a hill about a quarter of a mile northward of the north entrance point of the river.

Rio Guadarranque, a small stream, enters the bay about 9 cables eastward of the mouth of the Palmones; its mouth is obstructed by sandbanks, which extend from one cable to 2 cables from it, but there is an entrance channel deep enough for galleys at low water ordinary spring tides.

Coast.—Torre Rocadillo, 3 cables eastward of the mouth of the Rio Guadarranque, is square, and 4 cables south-east is Punta Mirador or Gallo; the shore between being closely skirted by rocks, with 10 fathoms water, at 2 cables from the shore. Between Punta Mirador and Punta Mala, 1¼ miles to the south-eastward, is a small bay, and near the beach on the eastern side are the villages Puente Mayorga (Orange grove) and Campamento. Punta Mala is low and surrounded by rocks, which mostly dry at low water; they extend off about 2 cables, and are steep-to.

Anchorages.—Between Rinconillo and Mirador points there is good anchorage, with winds from S.W., through N.W., to N.E., at about a third of a mile from the shore, in from 10 to 18 fathoms water, over mud bottom; at this distance from Punta Mirador the water is deep. South-easterly winds send in a sea, and on any signs of these winds the anchorage should be quitted.

The anchorage of Mayorga is considered, with easterly and south-easterly winds, to be the best in Gibraltar bay, being free from the squalls which blow over Gibraltar. The water is deep, there being from 16 to 18 fathoms, over sand and muddy bottom, at 3 cables off-shore, and rapidly deepening outside. It is much frequented by Spanish vessels seeking shelter from levanters.

Supplies.—Water and vegetables can be procured at the villages of Puente Mayorga and Campamento.

San Roque town (*Lat. 36° 12′ N., Long. 5° 23′ W.*), about 1½ miles northward from Puento Mayorga, stands on a hill 455 feet above the sea; it contained about 10,000 inhabitants in 1910, and is conspicuous from the entrance of the bay. There is a British Vice-Consul at San Roque.

Sierra Carbonera is the southern branch of the mountain ridge of Ronda, and on one of its highest points, situated at 1⅓ miles south-eastward of San Roque, is a circular tower, 968 feet above the sea, known as the Queen of Spain's chair.

Plan 144, Gibraltar.

Coast. — From Punta Mala the coast trends south-eastward to Linea, and thence turns gradually southward to the foot of Gibraltar,

General charts 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Plan 144, Gibraltar. Var. 14° 30′ W.

forming a bay in which the bottom is gravel with some patches of rock and weeds. At 6 cables westward of Linea the depth is about 3 fathoms, increasing to 18 and 30 fathoms at a distance of a mile.

The isthmus of Gibraltar consists of a level sandy plain, which, commencing at the foot of the Sierra Carbonera, where it has a width of 2½ miles, continues southward 1¾ miles to Gibraltar rock, at the base of which it is half a mile wide; it is very low, being from 2 to 6 feet above high water, and is generally barren.

Linea, a military post, and the extreme of Spanish territory as well as a suburb of San Roque, contained, in 1906, 16,619 inhabitants; it is situated 8 cables northward of Gibraltar. On its southern side are the remains of the Spanish lines of fortifications of 1732, the ruins of the two forts of San Felipe and Santa Barbara forming the western and eastern terminations.

The Neutral ground extends between the Spanish and the British lines about 3 cables further south; between the Neutral ground and the Rock are some gardens, the cemetery, and racecourse, and on the western coast some temporary houses, and a pier for watering.

GIBRALTAR.—This remarkable mountainous promontory rises abruptly, like a wall, on the south side of the Neutral ground, to the height of 1,396 feet above high water, extends 2¼ miles south, and is scarcely three-quarters of a mile in breadth.

Its north and east sides are precipitous, being accessible only to the monkeys which inhabit its rocky recesses; whilst on the west it falls in rugged slopes, on which there is some cultivation. It presents to the south several successive short terraces, descending one under the other and terminating in Europa point. *See* views, pages 86, 122.

Europa point (ancient Leon) forms the southern end of the rock of Gibraltar, and presents a front running north-west and south-east 3 cables, the termination of which are known as Little and Great Europa points. Shoal water, within the 5-fathoms line, extends from a half to one cable round the point, and to 1½ cables south-eastward of Great Europa point. *See* also Tide races, page 56.

LIGHT (*Lat. 36° 6′ N., Long. 5° 21′ W.*).—At the extreme of Great Europa point, on a cliff 98 feet high, is Victoria tower, grey, circular, and 61 feet in height; it exhibits, at an elevation of 156 feet above high water, a *group occulting white* light, with a *red* sector, showing *two* eclipses every *thirty seconds*, thus:—light, *twenty-two and a half seconds;* eclipse, *two and a half seconds;* light, *two and a half seconds;* eclipse, *two and a half seconds;* and is visible, in clear

General charts 1448, 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Plan 144, Gibraltar. Var. 14° 20′ W.

weather, from a distance of 18 miles. For sectors, *see* Light list and charts.

Fog signal.—In thick or foggy weather there will be *two* explosive *reports* in quick succession *every five minutes.*

Life-saving apparatus. — A rocket station is established at the Hutment barracks, eastward of Little Europa point. A life-buoy, with attached life-line, is kept near the Governor's cottage.

Rosia bay (*Lat. 36° 7′ N., Long. 5° 21′ W.*), less than a cable across, with depths of from 12 to 27 feet, and sheltered from the south-westward by a mole, is situated 2 cables southward of the dockyard; the victualling yard and naval hospital are near it.

SUBMARINE VESSELS. — CAUTION. — Submarine vessels are being constantly exercised in the vicinity of Gibraltar. In order to minimise the risk of collision with other vessels, the vessel escorting the submarines will, when the latter are exercising, display a large red flag at the masthead. Every vessel seeing this signal should steer so as to give the escorting vessel a berth of at least one mile, and also to pass astern of her; when from any cause this cannot be done, the escorting vessel should be approached at a slow speed until warning is given by flags, semaphore, or megaphone, as most convenient, of the danger zone, a good look-out being kept meanwhile for the submarines whose presence may be only indicated by their periscopes showing above water.

Admiralty waters. — When any of H.M. Ships are about to enter or leave Admiralty waters, the following signals will be shown at the Dockyard flagstaff, and repeated at the lighthouse on the north end of the South mole, and also at the lighthouse on the south end of the North mole:—

By day.—A square red flag.

By night.—A *red* light and a *green* light, vertical, 6 feet apart.

When these signals are displayed, no merchant or other private vessel shall attempt to enter, leave, or move within Admiralty waters.

Caution. — Passing vessels should at all times give the entrances to Gibraltar harbour a good berth, and more particularly when the above signals are shown.

Regulations.—*See* Appendix V.

HARBOUR.—South mole.—This mole commences near the middle of the western side of the Rock, and extends north-westward for 1,400 yards, leaving, between its northern end and the southern end of the Detached mole, a passage, one cable wide, forming the

Plan 144, Gibraltar. Var. 14° 20′ W.

south entrance to the harbour. Coal stores extend nearly the whole length of the South mole.

There are 3,500 feet of berthing accommodation on the eastern side of South mole, suitable for large vessels.

Detached mole. — From a position 0° true, distant one cable from the outer end of South mole, a detached mole extends 339° true for 910 yards; between its northern end and the southern extreme of the arm of North mole, which bears 39° true from it, is the northern entrance of the harbour, 220 yards wide.

There are 2,600 feet of berthing accommodation on the eastern side of the Detached mole, suitable for large vessels.

North mole (*Lat. 36° 8′ N., Long. 5° 22′ W.*). — The Old mole, originally constructed in 1618, has been lengthened, and extends 400 yards north-westward from the north-west part of the Rock; an opening, about 120 yards wide, over which there is a viaduct, separates the Old mole from North mole, which extends 285° true for 200 yards, and then 270° true for about 520 yards; an arm then projects southward at right angles for 500 yards.

Five jetties extend in a southerly direction from North mole; the four western are each about 340 feet long, and the eastern 400 feet.

North jetty, on the outside of the western extreme of North mole, is 310 feet in length in an easterly and westerly direction, and has a cargo shed on it.

The North mole and jetties are almost entirely occupied by coal sheds, and railway lines are laid from each of the quays to the bonded sheds on the Old mole.

Within these breakwaters is a sheltered harbour about $1\frac{4}{10}$ miles long, north and south, and $3\frac{1}{2}$ cables wide, having an area of 303 acres available for vessels of all sizes.

Moorings have been laid down in the harbour for the use of His Majesty's ships, but the ground is bad for anchorage, the dredging having left only bare rock in places. Within the harbour, exclusive of the North mole, there are 8,040 feet of berthing accommodation for large vessels.

In bad weather, when a swell enters the southern entrance, accompanied by violent squalls from south-west (which sometimes occurs during "levanters"), additional precautions are required in securing vessels alongside the Detached mole, near its southern end, and at the jetties extending from North mole; heavy wires and securing ropes not infrequently part, and bollards have been known to be torn out of the ground under such circumstances.

Depths.—In the southern entrance to the harbour, the depth is between 8 and 9 fathoms, except within 50 feet of the mole heads,

General charts 1448, 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Plan 144, Gibraltar. Var. 14° 20′ W.

where it is from 5 to 6 fathoms; in the northern entrance there are from 5½ to 9 fathoms, with less close to the mole heads.

Cambers. — On the eastern side of the harbour is a destroyer camber, and two auxiliary cambers; the north and south elbows of the west wall of the southern auxiliary camber are marked by red beacons, 15 feet high.

Ragged Staff landing place is situated on the south side of the entrance to the southern auxiliary camber.

The western side of the wall on the north side of the entrance to the destroyer camber provides 340 feet of berthing for a large vessel.

Southward of the destroyer camber are storehouses, workshops, and offices, and at the southern end of the harbour three dry docks. A fourth dry dock is northward of the cambers, near the King's bastion; the approach is marked by dolphins on either side.

LIGHTS.—South mole (*Lat. 36° 8′ N., Long. 5° 22′ W.*).—The light on the extremity of the South mole is *white flashing, every five seconds*, thus:—flash, *one and one-third seconds;* eclipse, *three and two-thirds seconds.* It is exhibited at an elevation of 50 feet from a cylindrical tower about 47 feet high.

Detached mole.—From each end of the Detached mole is shown a *white* and *red alternating* light *every three seconds.* These lights are exhibited, at an elevation of 35 feet, from iron lattice-work towers, 25 feet high, with cylindrical bases.

Both lights are unwatched.

North mole. — From the south end of this mole is exhibited a *white occulting* light, *every twenty seconds*, thus:—light, *seventeen seconds;* eclipse, *three seconds;* it is elevated 50 feet, and exhibited from an iron lattice-work cylindrical tower, 47 feet high.

From the north-west angle of the North mole is shown a *red occulting* (unwatched) light *every ten seconds*, thus:—light, *seven seconds;* eclipse, *three seconds.* It is elevated 35 feet, and exhibited from an iron lattice-work tower on a cylindrical base, 31 feet high.

Ragged Staff. — A *fixed green* light, at an elevation of 25 feet above high water, is shown from a lamp-post at the Ragged Staff landing place.

Coal hulks. — In order to facilitate entering the bay by night, each of the hulks in the southern line, known as Nos. 5, 20, 16, and 59, is marked by a *green fixed* light, elevated 80 feet.

These lights are shown from the mainmast head, and are in addition to the white anchor light.

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Plan 144, Gibraltar. Var. 15° 20′ W.

Fog signal. — In thick or foggy weather a bell on the South molehead is struck *every ten seconds.*

Beacons. — Two red beacons, 15 feet in height, are situated on the two angles of the southern auxiliary camber.

Directions for entering the harbour.—Vessels proceeding into Gibraltar harbour in order to secure to the South mole or to the mooring buoys abreast of it, should enter by the southern entrance, making the approach from the northward.

Vessels going alongside the Detached mole or to the buoys abreast of it, or to the North mole, should, if possible, enter by the northern entrance, and the best approach is made by passing northward of the southernmost coal hulk.

Vessels securing to mooring buoys abreast the Detached mole, when going astern to pick up their buoys, invariably find their sterns deflected towards the Detached mole.

This should be borne in mind when other vessels are proceeding alongside the mole at the same time.

Great care is necessary when passing through either entrance to the harbour on account of the strong stream that at times runs outside the moles. *See* Tidal streams, page 105. A vessel entering may find her bow in comparatively slack water, and her stern in the full strength of the stream, and the reverse on leaving the harbour.

A large vessel should not enter the harbour when the wind is strong until a tug is ready to assist in berthing, either alongside the moles or at moorings, and if remaining for any time should shackle on both bridles to the buoy.

Current indicator. — A current indicator has been moored at a distance of a cable 213° true from the light on the head of the South mole. This indicator consists of a pole buoy surmounted by a pointer or arrow marked "Current indicator." The point of the arrow points in the direction in which the current is running. Should indicator be at all dipping from the horizontal it shows a strong stream; it is, in fact, at times, dragged under water.

Tidal streams are most irregular, and the current indicator is the only safe guide.

CAUTION.—Searchlights.—Electric searchlights are sometimes worked for exercise at various positions on the rock of Gibraltar, and although instructions have been given to avoid directing these lights towards vessels approaching the port, they render navigation difficult at night, and great caution is then necessary.

Any vessel approaching Gibraltar harbour when searchlights are being worked, and finding that they interfere with her safe naviga-

Plan 144, Gibraltar. Var. 14° 20′ W.

tion, may make use of the following signals, either singly or combined:—

(*a*) By flashing lamp, *four short* flashes followed by *one long* flash.

(*b*) By whistle, siren, or fog horn, *four short* blasts followed by *one long blast.*

Whenever possible, both flashing lamp signals and sound signals should be used.

On these signals being made, the searchlights will be worked so as to cause the least inconvenience, being either doused, raised, or their direction altered.

The signals should not be used without real necessity, as unless the vessel is actually in the rays of the searchlight it is impossible to know which searchlight is affected.

Note.—These signals are designed to assist mariners, and do not render the Government liable in any way.

Anchorages (*Lat. 36° 9′ N., Long. 5° 22′ W.*).—In Gibraltar bay the space between the north-western angle of the North mole and Punta Mala is almost entirely occupied by coal hulks, and it is necessary to be cautious in approaching these at night as the tidal streams are strong. Their positions are shown on the plan, and each vessel of the southern line shows a *green* light at night. There is anchorage off the Neutral ground in any convenient place, but it is necessary to have the Devil's tower, at the north-eastern foot of the rock, open of the north front, to avoid the heavy squalls and eddies during strong easterly winds, and to get the steady breeze over the Neutral ground. This limit is locally known as the "Squall-line," with San Roque church in line with Punta Mala and the Devil's tower a little open there are from 15 to 18 fathoms water, good holding ground, but, as before mentioned, many hulks are moored hereabouts; outside this position the water suddenly deepens. Small vessels lie further in, eastward of the hulks, according to their draught.

Merchant steam vessels, including mail steamers, anchor off the North mole, northward of the centre of the southern arm and as near the hulks as convenient.

As south-westerly winds blow directly into the bay and send in much sea, vessels during winter, or an approaching gale from that quarter, should either leave the anchorage for Palmones or let go a second anchor and otherwise make the vessel snug. Neglect of these precautions has often strewn the shore of the Neutral ground with wrecks.

Man-of-war anchorages.—A space off South and Detached moles is reserved for vessels of war, the limits are: On the south, a

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Plan 144, Gibraltar. Var. 14° 20′ W.

line from a position on South mole 880 yards inside the lighthouse at the head of the mole, 270° true, for 9½ cables: then, on the West, a line drawn 0° true for 6 cables, and from there a line drawn to the Detached mole, bearing 63° true, marks the northern limit.

This anchorage is not recommended for masted vessels, on account of the heavy squalls and eddies during strong easterly winds. Anchor there as convenient, but the outer part is better than the inner, and anchorage should not be taken up with Rosia mole bearing less than 120° true. A good berth is in 25 fathoms, nearly 3 cables westward of South mole lighthouse, with the north-western corner of the North mole in line with the northern end of the Detached mole, bearing 12° true, and the tower of the dockyard offices in view through the gap between Nos. 1 and 2 coal stores on South mole.

For masted vessels of war there is anchorage northward of the centre of the outer arm of the North mole, bearing about 87° true. Merchant vessels, and foreign vessels of war, are permitted to use this anchorage with the understanding that they will be moved by the port authorities, if the space should be required for His Majesty's ships.

Both reserved spaces are shown on the plan in pecked lines.

Examination anchorage (*Lat. 36° 8′ N., Long. 5° 22′ W.*). —An area for the examination of vessels under the circumstances described inside the cover of this book has been appropriated to the westward of the South mole which forms its eastern limit: the other limits are:—on the north a line drawn from the northern extremity of the South mole, 270° true, for a distance of 6 cables: then, on the West, a line drawn 180° true for 6 cables, and from thence a line drawn 90° true to the shore marks the south limit.

Tides.—It is high water at Gibraltar South mole, full and change, at 1h. 43m.: springs rise 3¼ feet, and neaps 2½ feet: neaps range 17 inches. The tide rises for 7 hours and falls for 5½ hours approximately. Strong gales sometimes cause the water to rise considerably above the usual level.

The datum to which the soundings in Gibraltar bay are reduced on the Admiralty charts is one foot 3 inches below Ordnance datum at Gibraltar.

Chart 1448, Acebuche point to Chullera point, &c.

Tidal streams. — The west-going stream, which commences at about 2½ hours after high water, enters the bay round Europa point, and sets towards Carnero point, where it divides into two parts, one of which continues westward, and the other runs northward along the western shore of the bay: also after the stream passes Europa point a portion turns northward, and runs along the eastern shore of the

General charts 1448, 142, 773, 92, 2717, 1, 2458a, 1226, 449.

No. 354.—Gibraltar Bay—Caution with Regard to Examination Anchorage; Light-Buoy Established.

Position.—South mole lighthouse, lat. 36° 07¾′ N., long. 5° 21¾′ W.

Caution.—Mariners are hereby warned that, under no circumstances should vessels anchor to the southward of the southern limit of the area marked "Examination Anchorage" on the charts, and in the event of this anchorage being fully occupied, vessels should remain under weigh outside.

Remarks.—The north-west corner of the Examination Anchorage is marked by a light-buoy exhibiting an *occulting green* light, situated at a distance of 6 cables, 270° (*N. 76° W. Mag.*), from the lighthouse on the head of the South mole; a black mooring-buoy is moored off the south-east corner of the above anchorage, in the position shown on the charts.

Note.—The light-buoy mentioned above is to be inserted on the charts.

Variation.—14° W.

Chart No. Med. 1, p. 104.

No. 364.—GIBRALTAR BAY—CAUTION WITH REGARD TO EXAMINATION ANCHORAGE: LIGHT-BUOY ESTABLISHED.

Position.—South mole lighthouse, lat. 36° 07¼′ N., long. 5° 21¾′ W.

Caution.—Mariners are hereby warned that, under no circumstances should vessels anchor to the southward of the southern limit of the area marked "Examination Anchorage" on the charts, and in the event of this anchorage being fully occupied, vessels should remain under weigh outside.

Remarks.—The north-west corner of the Examination Anchorage is marked by a light-buoy exhibiting an occulting green light, situated at a distance of 6 cables, 270° (W. 76° W. Mag.), from the lighthouse on the head of the South mole; a black mooring-buoy is moored off the south-east corner of the above anchorage, in the position shown on the charts.

Note.—The light-buoy mentioned above is to be inserted on the charts.

Variation.—14° W.

Chart No.

Med. I. p. 104.

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No. 436.—Gibraltar Bay—Regulations with regard to Examination Anchorage.

Former Notice.—No. 354 of 1916.

Position.—South mole lighthouse, lat. 36° 07¾′ N., long 5° 21¾′ W.

1. Mariners are warned that, under no circumstances should vessels anchor to the southward of the southern limit of the area marked "Examination Anchorage" on the charts, and in the event of this anchorage being fully occupied, vessels should remain under weigh outside.

2. When at anchor in the Examination anchorage, if, in the opinion of the master, the vessel is in danger during heavy weather or in case of emergency, the vessel may proceed to sea or take shelter off the Spanish coast without permission from the Naval Authorities being required and without a pilot.

Vessels thus leaving the anchorage and proceeding to the Spanish coast are prohibited from crossing a line drawn in 270° (*N. 76° W. Mag.*) direction from the south mole lighthouse until half way across the bay.

Vessels acting under the above circumstances are to return to the Examination Anchorage as soon as practicable.

Variation.—14° W.

Med. 1, p. 104.

No. 136.—GIBRALTAR BAY—REGULATIONS WITH REGARD TO EXAMINATION ANCHORAGE.

Former Notice.—No. 254 of 1916.

Position.—South mole lighthouse, lat. 36° 07¼′ N., long 5° 21¾′ W.

1. Mariners are warned that, under no circumstances should vessels anchor to the southward of the southern limit of the area marked "Examination Anchorage" on the chart, and in the event of this anchorage being fully occupied, vessels should remain under weigh outside.

2. When at anchor in the Examination anchorage, if, in the opinion of the master, the vessel is in danger during heavy weather or in case of emergency, the vessel may proceed to sea or take shelter off the Spanish coast without permission from the Naval Authorities being required and without a pilot.

Vessels thus leaving the anchorage and proceeding to the Spanish coast are prohibited from crossing a line drawn in 270° (W. 76° W. Mag.) direction from the south mole lighthouse until half way across the bay.

Vessels acting under the above circumstances are to return to the Examination Anchorage as soon as practicable.

Variation.—14° W.

Med. 1, p. 104

Chart 1448, Acebuche point to Chullera point, &c. Var. 14° 20′ W.

bay. The streams running northward on both sides of the bay meet at its head, and combining, form a southerly stream in the middle of the bay, which joins the west-going stream in the strait.

The stream on the western side is much stronger than that on the eastern; it commences at Carnero point at 2 hours after high water there, and in about an hour it reaches Getares bay, but does not penetrate to Algeciras until 2 hours after the turn of the stream. The stream on the eastern side of the bay does not reach the anchorage off Gibraltar until 3 hours after the western stream has made at Europa point, or until about 6 hours after high water at Gibraltar, the consequence of which is that the west-going stream runs for a shorter period than the east-going, and also with much less strength.

As soon as the east-going stream commences inshore in the strait, which is about 4 hours before high water, it enters Gibraltar bay round Carnero point, and runs north-eastward across the bay. At the north-east part of the bay it divides, one part running southward on the eastern side of the bay, the other, which is the larger branch, sets round the head of the bay and southward along the western shore; thus on both streams there are three different sets in the bay. These streams change regularly every 6 hours at 2 or 3 hours after and 4 or 3 hours before high water. It has been observed that the particular sets or eddies produced by the general tidal streams are subject to considerable variation. Not only has the wind a considerable influence over them, but their rate and extent depend much on its force.

Off Carnero point the stream runs almost always either N.W. or N.E., and consequently its general tendency is towards the shore. Carnero point, or perhaps Acebuche point westward of it, is one of the most difficult for vessels to get round from the eastward; and Carnero point is the most dangerous in the strait, many accidents occurring there in consequence of the above-mentioned streams.

The tidal streams at the anchorage at Gibraltar run generally south-eastward during the falling tide, and northward during the rising tide. These movements are, however, much affected by winds, and may be wholly masked or reversed, while the strength of the stream may sometimes be considerable.

Plan 144, Gibraltar.

In the neighbourhood of the moles the tidal stream usually sets northward during the rising tide and southward during the falling tide, the turn of the stream taking place at about high and low water on the shore. The north-going stream sets across the southern entrance to the harbour, striking the southern end of the Detached mole; one portion of that stream enters the harbour, and sets northwards inside the Detached mole, sometimes spreading and extending

General charts 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Plan 144, Gibraltar. Var. 14° 20′ W.

to the eastern side of the harbour; the other and main part of the stream continues northward outside the Detached mole past the northern entrance, but does not perceptibly enter it.

The south-going stream sets outside the harbour, but a portion runs through the viaduct at the North mole and towards the northern end of the Detached mole; this portion then divides, and one part of but little strength goes out through the northern entrance, the other part sets southward on the inside of the Detached mole and increases in strength as it approaches the southern entrance, which it crosses directly towards the north-eastern end of the South mole, with a varying but at times a strong rate; then turning round the South molehead it joins the south-going stream outside.

Off the moles, the north-going stream attains a maximum rate of from one to 2½ knots, increasing to 3 knots abreast the south entrance; the rate of the south-going stream is from a half to 3 knots, except off the north entrance, where it is 2 knots, and close to South molehead, where it attains 3½ knots.

The rate of the stream entering the south entrance does not exceed 2 knots, and that issuing from it 1¼ knots.

Chart 1448 and plan 144.

Directions. — In a steam vessel, bound into Gibraltar bay from the westward, give a fair berth to the Pearl rock and Carnero point (*see* pages 92, 93), and then steer direct for the anchorage. From the eastward, round Europa point at a moderate distance, and then steer for the anchorage. When proceeding to anchor remember that the tidal streams are sometimes strong.

A sailing vessel from the westward, with the wind from that quarter and bound into Gibraltar bay, should give a fair berth to Pearl rock and Carnero point; bearing in mind that the current has a tendency towards the latter, and that squalls come down from the high land over it. With an easterly wind and a heavy sea, Carnero point should be carefully avoided, and the southern board continued until the vessel can reach the middle of the bay on the starboard tack: then keep in the steady wind, westward of the strong squalls and eddies which blow over the rock, and work up to a convenient anchorage.

If from the eastward with westerly winds, a vessel should work round Europa point with the west-going stream, standing but little off, and towards the point to a prudent distance. But with an easterly wind, after having rounded the point, keep up the middle of the bay in the steady breeze beyond the reach of the squalls, the demarcation of which will be seen. The edge of the bank off the Neutral ground is steep-to.

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Plan 144, Gibraltar. Var. 14° 20′ W.

Should the wind be fresh from the eastward and southward of East, the squalls on the west side of the rock will be from the southward, when a vessel may steer for the anchorage off the South mole before the squalls; but if the wind be northward of East, the squalls will be from the northward, and a vessel should then work up in the steady breeze until near the anchorage off the Neutral ground, and then run down for the mole before the squalls, under easy sail.

The eddy winds from the rock on its east side, caused by westerly winds, are as dangerous as those on its west side produced by easterly winds, and vessels should never go within the line of the steady breeze when approaching it, to round Europa point.

Docks. — There are three dry docks in His Majesty's dockyard, and one Admiralty dry dock near the King's bastion; there are also several patent slips. For particulars, *see* Appendix I.

Repairs. — At His Majesty's dockyard there are numerous machines for the repair of vessels; boilers of large size can be repaired, and large repairs to machinery effected.

At the dockyard there are sheers capable of lifting 100 tons, and cranes to lift weights of from 50 to 10 tons, besides many of less power.

On the North mole and arm are two cranes, one a travelling crane to lift 3 tons, and the other a 10-ton breakdown crane.

At Gibraltar there is an English firm who undertake ordinary repairs of machinery, having sheers capable of lifting 10 tons, a 2-ton crane, a small smithy, and steam hammer, and another firm has a small smithy.

Telephone cable.—A cable is laid between, and slightly inside, the Detached and South moles.

Signal stations. — The signal station is on a ridge of rock, 1,295 feet above high water, and about 8 cables southward of the north front.

The naval signal station is situated at the northern end of Windmill hill flats, and about half a mile northward from Europa point lighthouse.

Lloyd's signal station is at the naval station. Arrangements have been made to take pyrotechnic light signals, and also any messages made at night by means of a flashing lamp, in accordance with the Morse code. Messages may be transmitted from this station to vessels by flashing lamp in the same manner.

Time signals are made daily during daylight (Sundays included) in the following manner:—A ball is hoisted at the western yardarm of the flagstaff at the Naval signal station, at five minutes

Plan 144, Gibraltar. Var. 14° 20′ W.

before every hour and dropped exactly at the beginning of each hour, Greenwich mean time.

Should the signal fail the ball will remain hoisted till 10 minutes after the hour, and then it will be lowered slowly. *See* List of Time signals.

Lifeboat.—A lifeboat is kept at the inner end of the North mole.

The town stands on the north-western side of the rock, and shelves down to the bay; it contains the Governor's house, cathedral and other churches, exchange, civil hospital, library, &c., and by the last census (1911) had a population of 19,596, excluding the garrison. The naval and victualling departments are established south of the town.

Trade. — Gibraltar is a free port, and the trade is considerable; the exports consist of wool, lead, copper, &c., and imports of cottons, woollens, hardware, wines, spirits and malt liquors, coal, silk, iron, tea, &c. The amount of coal supplied to 1,424 passing vessels in 1910 was 170,942 tons. In the same year 3,200 steam, and 438 sailing vessels entered the port, with aggregate tonnages of 5,438,396 and 44,163 tons respectively.

Communications. — There is frequent steam communication with all parts of the world. There is communication with Algeciras by steam ferry at short intervals during each day. The telegraph office is always open. *See* also page 6.

Telegraph cables. — There are cables to Lisbon, Vigo, Cornwall, Cadiz, Tangier bay, and Malta. A red mooring buoy for the telegraph steam vessel is placed rather over a cable off Camp bay, about 1½ cables southward of Rosia bay.

Coal. — In addition to the Admiralty coal, private firms have upwards of 38,000 tons in stock. Vessels in the bay coal alongside hulks or by lighters, and 250 to 600 tons can be placed on board in 12 hours, or 500 to 1,000 tons in 24 hours continuously. Labour is plentiful. Coaling in the bay is interrupted by all winds which cause much swell.

Supplies. — The town is well supplied with meat and vegetables from Spain and Marocco. There are reservoirs near the victualling establishments at Rosia bay. Shipping at the anchorage are supplied with fresh water by a floating tank; men-of-war alongside the Dockyard and South mole by means of a hose, and at the North and Detached moles by floating tank. The water from the wells at the North front is bad.

General charts 1448, 142, 773, 92, 2717, 1, 2158a, 1226, 449.

Plan 144, Gibraltar. Var. 14° 20′ W.

Winds, weather, fog.—*See* tables in Appendix III.

The east coast of the rock of Gibraltar is steep and inaccessible; there are less than 5 fathoms from 1½ to 3 cables off it. A conspicuous object is a rain-water catchment above the village in Catalan bay; the water collected flows through a tunnel to the western side of the rock. The description of this coast is continued at page 127.

Tidal stream.—On the eastern side of Gibraltar the tidal stream ordinarily runs to the southward, for about 3½ hours after high water, to about high water at Gibraltar, or for 8½ hours. The northern stream, which is often represented by merely a stand, runs from half an hour after high water to 3½ hours after high water at Gibraltar, or for about 3 hours.

Chart 142, Strait of Gibraltar.

MAROCCO.—CAPE SPARTEL (Raz-el-Skukkar of the Arabs), the north-west extremity of Africa, and the south-western limit of Gibraltar strait, terminates in a steep mass of black, conical-shaped rock, which when seen from the north and south, appears detached like an islet. It is commanded by high land, which reaches 1,063 feet above high water in Mount Spartel (Jebel Kabeer), being part of a chain extending east and west; southward of the cape the land falls rapidly, forming an extensive plain, in the middle of which is Jebel Djebila (Mount Nipple), 436 feet high, remarkable by its isolation and conical form, but on some bearings it appears as a round hill with an uneven summit. *See* view on chart 1228, and views, page 122.

The depression in the land to the southward of the cape may sometimes be mistaken for the entrance to the Strait of Gibraltar at night, when the low land cannot be seen, but this error may be avoided by attention to the soundings.

The cape is skirted by a reef which extends about 2 cables seaward, and foul ground extends to the south-westward, a detached reef, which dries 4 feet, lying 2 cables from the shore. With the lighthouse between the bearings of 75° and 98° true the land should not be approached within a distance of three-quarters of a mile. The high land over the cape is conspicuous when on a south-easterly bearing, as then two remarkable patches of grey vertical rock are seen at about a third of its height from the summit.

LIGHT (*Lat. 35° 47′ N., Long. 5° 56′ W.*).—At half a mile eastward of Cape Spartel is a square white stone tower, 79 feet in height, from which is exhibited, at an elevation of 312 feet above high water, an *occulting white* light, showing an eclipse of *two seconds* duration *every ten seconds*, visible, in clear weather, from a distance of 23 miles.

Fog signal.—An explosive fog signal gives *one* report *every three minutes.*

General charts 773, 92, 2717, 1228, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 40′ W.

Lloyd's signal station.—At about 300 yards south-westward of Cape Spartel lighthouse is a Lloyd's signal station, communication with which can be made by the International code of signals. The station is connected with the universal telegraph system, and signals from vessels will be forwarded, if requested; vessels hoisting their national flag and International code distinguishing signal, can be reported by letter or telegram to any person who may have previously applied (and given his address) for such information.

The Moorish flag flies at the station.

Tidal race.—It is necessary to guard against the tidal races which are sometimes produced by the strong tidal streams in the vicinity of Cape Spartel. *See* page 56.

CAUTION.—Landing.—Tangier is the only place on the north coast of Marocco, between Cape Spartel and Ceuta, where landing is permitted, and vessels, anchoring at other places, have been fired at.

Depths off-shore.—The 100-fathoms contour line passes about 2½ miles northward of Cape Spartel, but immediately north-westward of the cape it reaches, in a narrow gut, almost within a mile of the cape.

Spartel bay (*Lat. 35° 46′ N.; Long. 5° 56′ W.*).—About a mile southward of the lighthouse is a sandy bay, where small vessels find shelter from easterly winds, in 6 or 7 fathoms water, at half a mile from the beach, but with these winds heavy squalls blow off the land, and a continual swell renders landing difficult. The bay itself is shoal.

Jeremias anchorage, about 3½ miles southward of Cape Spartel, is much resorted to by vessels prevented from entering the strait by strong easterly winds. At 1½ miles from the shore there are about 20 fathoms water, over sand and gravel, and good holding ground.

A good berth is in 24 fathoms, and the 10-fathom contour line runs parallel to the shore at a distance of two-thirds of a mile.

Directions.—Approaching the Strait of Gibraltar, if a levanter comes on, stand well to the southward, and work up, anchoring in from 7 to 10 fathoms, with Jebel Djebila (Mount Nipple) bearing 60° true, which is the southern limit of heavy squalls.

During the prevalence of easterly winds it is preferable for sailing vessels wishing to enter the strait, to keep on the African coast rather than on the Spanish, as it is free from danger, and they are in a better position to profit by any change in the direction or force of the wind: for this purpose it is more prudent for a sailing vessel to keep under sail.

General charts 92, 2717, 1228, 1, 2158a, 1226, 449.

Chart 142, Strait of Gibraltar. Var. 14° 40′ W.

Coast.—North-eastward of Cape Spartel the coast is high and of uninterrupted steep cliffs, at the base of which a little beyond the cape are the Needles, black pinnacle rocks above water. At about 1¼ miles from the cape is Frailecito point, at the termination of which is a small black islet surrounded by rocks. The coast then turns eastward for 3 miles with fewer cliffs, but high and irregular to Judios point, the most projecting part between being Pigeons point, remarkable and well defined when seen either from eastward or westward.

Plan 1912, Tangier bay.

Judios point is more salient and remarkable than either of the other points, and is known, from seaward, rather by the white cliffs that form it than by the point itself, which is only well defined from east or west. The coast between Cape Spartel and a point situated one mile east of Pigeons point is steep-to.

Judios bay (*Lat. 35° 48′ N., Long. 5° 50′ W.*), nearly three-quarters of a mile eastward of Judios point, has a small sandy beach at its head, and the only one on this part of the coast. Judios rivulet, a small stream, flows into the bay, having passed through a narrow valley which separates the uneven, irregular, high land of Cape Spartel from Marchan plateau, which is level, covered with gardens, and 338 feet above high water. These heights and the valley which presents a remarkable break, are recognisable, even at night, in clear weather.

On the eastern point of the bay, Amaier point (Punta Amainer), are the ruins of a fort; and a marabut tower stands on the slope of the high land on its western side.

Tangier point.—A white and reddish cliff commences at Judios bay and terminates at Tangier point, distant one mile to the south-eastward: from a distance it appears like a patch in the middle of the coast. Reefs and shoal water extend for a distance of about 3 to 4 cables off this coast. Tangier point terminates in low rocks; shoal water extends nearly 4 cables north-eastward of the point.

TANGIER BAY, one mile deep, is comprised between Tangier point and Malabata point. The bay from the offing appears much deeper than it really is, from being surrounded by high land: nearly all its western shore is a clean sandy beach, with from 5 to 6½ fathoms water at 3 cables distant, except in the vicinity of Bourée rock, but off Fort Khandouri (Arabi-el-Said), 2½ miles eastward of the town, rocks and foul ground extend from one to 1½ cables from the foot of the cliffs.

Aspect.—Malabata point, at the eastern extremity of the bay, is a bold prominent headland terminating in cliffs bordered by

Plan 1912, Tangier bay. Var. 14° 40′ W.

rocks, some of which dry from 2 to 3 feet at low water; 3 cables south-westward of the point the 3-fathoms contour line extends about 2 cables from the nearest coast. On the point is a battery and a circular white tower, named Blanquilla, the top of the latter being 239 feet above high water; the land within the point rises to a height of 792 feet.

Le Charf (Mount Direction) (*Lat.35°45′N.,Long.5°47′W.*), an isolated hill with a flat summit 338 feet high, about two-thirds of a mile inland over the head of the bay, serves as a mark for the anchorage; and a little eastward of it is another hill, not so high, on which there is a white marabut tower. Galeras rivulet winds between these hills and falls into the sea near Old Tangier; it is crossed by two bridges, the inner one white, and that nearest the sea in ruins. Another rivulet joins Galeras rivulet immediately northward of the ruins of Old Tangier.

There are two batteries on the eastern side of Tangier bay, Fort Khandouri or Arabi-el-Said at the termination of the sandy beach, close to which there is a high, ruined tower; and Achmet fort, half a mile further north-eastward.

A sardine factory with a red iron chimney lies close to the coast, 8½ cables south-eastward from the red and white light; this is a good mark to steer for when approaching the anchorage. A large isolated house, Maison Gautsch, with a group of three small cottages close south-eastward of it, lies 2¼ cables north-westward from the factory.

DANGERS.—Western side.—A detached shoal, with a least depth of 3¾ fathoms over it, lies 60° true, distant 5½ cables from the Mole head lighthouse. The large isolated house, Maison Gautsch, north-westward of the factory in line with a conspicuous tree, Magada, near the summit of an inland hill, bearing 199° true, leads close eastward of the eastern end of the shoal.

Besides the shoals off Tangier point, described on previous page, this side of the bay is fronted by several shoal patches of 2¾, 3, and 3½ fathoms, which lie nearly half a mile from the shore.

Buoy.—A red sphero-conical buoy, with staff and truncated cone topmark, is moored in 5 fathoms, and marks the extreme of the shoal water off Tangier point, but is inside the detached shoal just mentioned.

Eastern side.—Almirante rock, a rocky shoal, with from 3½ to 4¾ fathoms water over it, lies about 6 cables northward of Malabata point, and in the approach to Tangier bay from the eastward. There is generally a swell over it, and with strong winds from the westward, heavy seas break on the rock. Between the rock and the shore there is a channel with from 9 to 11 fathoms water, which should

General charts 92, 2717, 1, 2158a, 1226, 449.

Plan 1912, Tangier bay. Var. 14° 40′ W.

not be used by a large vessel, except in a case of necessity. Malabata point should be passed at a distance of over a mile in 11 to 18 fathoms water and seaward of the shoal. *See* Tide races, page 56.

Bell-buoy. — A black bell-buoy, with a truncated cone topmark, marks Almirante rock, but there is a depth of 4¾ fathoms close outside it.

Seuil du burj is a rock with a least depth of 1½ fathoms on it; it lies about 4 cables from the eastern shore of the bay, with Malabata point bearing 23° true, distant 8½ cables.

Khandouri shoal, with less than 6 feet of water over it, lies with Fort Khandouri bearing 130° true and distant 4½ cables; for one cable northward of it the depth is 4¾ fathoms, elsewhere around the water is deep.

Bourée rock, about half a mile from the southern shore of the bay, is about 1½ cables in extent, and has from 3 to 12 feet water, but the sea seldom breaks on it. From its shoalest part, Fort Khandouri bears 99° true distant 7 cables; shoal water extends half a cable eastward and 1½ cables westward from this position. A shoal spit, with 3¾ fathoms on its outer edge, extends 4 cables from the shore towards Bourée rock; there are depths of 6 and 7 fathoms between the rock and the spit.

Lights (*Lat. 35° 47′ N., Long. 5° 48′ W.*).—A white circular lighthouse stands on the platform of the low battery at the south-east angle of Tangier sea wall, and exhibits a *fixed red* and *white* light, at an elevation of 58 feet above high water. The *red* light is visible in clear weather from a distance of 5 miles. For sectors, *see* Light list and plan.

A black vertical line, 4 feet wide, is painted on the town wall, and in line with the lighthouse indicates direction of the dividing line between the two colours of the light.

A *fixed green* light is exhibited, at an elevation of 18 feet above high water, from an iron framework, 15 feet in height, at the end of the mole; it is visible, in clear weather, from a distance of 2 miles.

Signals. — There is a signal mast, 46 feet in height, on the rampart near the lighthouse, which, in bad weather when boats are unable to land, enables vessels to communicate by the International code.

Mole. — From the foot of the battery at Tangier point, rocks, which cover at high water, extend 2 cables eastward, and upon them a mole has been built which affords shelter to small craft, from north-easterly and north-westerly winds, in depths of less than one fathom at low water. It extends about 220 yards eastward from the point and then trends south-eastward for 200 yards further. Land has been

General charts 92, 142, 2717, 1, 2158a, 1226, 449.

Plan 1912, Tangier bay. Var. 14° 40′ W.

reclaimed from the sea, in front of the town walls, for a distance of 3¾ cables southward from the mole.

Jetty. — About a cable southward of Tangier point, is a jetty 1,095 feet in length, and constructed of wood excepting the inner end which is of masonry. The jetty head, 301 feet long and 20 feet broad, has a depth of 7 feet alongside it at low water, spring tides; there are landing steps on its southern side, midway in, where the depth is 2 feet at low water, spring tides. The jetty is furnished with a crane, rails, and waggons for merchandise, and small steamers go alongside. The Custom-house is near the inner end.

Submarine telegraph cables. — A Spanish cable connects Tangier and Ceuta; French cables connect Tangier with Oran and Cadiz; and a British cable (Eastern Telegraph Company) connects Tangier and Gibraltar.

The cable house of the Eastern Telegraph Company, situated about 2 cables south-westward of Khandouri tower, is the northern of two conspicuous white towers, 50 yards apart, with a conspicuous white house 100 yards from them. There is a land line from the cable house into Tangier. The Spanish cable house is about 4 cables westward of the British cable house and the French about one mile westward.

Buoys. — A black can buoy, surmounted by a black cone, with a white horizontal band marked "Telegraph," is moored about 4 cables westward of Bourée rock, and marks the French cables.

A black spherical buoy with black and white horizontal striped staff and black diamond topmark, with "Cable" in white letters on it, is moored 328° true, distant one mile, from Fort Khandouri, and marks the Spanish cable.

A small cask buoy, as presently mentioned, marks some disused moorings.

Anchorage (*Lat. 35° 47′ N., Long. 5° 47′ W.*).—Tangier bay is the only anchorage of any importance on the southern shore of Gibraltar strait which may be used by vessels of any size; although exposed to winds from north-west, round by north, to north-east, it affords security with those from other directions. North-westerly winds, and even winds so far round as south-west, cause a considerable sea; with northerly and north-easterly winds the sea is not so heavy.

A vessel may anchor anywhere in the middle of the bay in about 7½ fathoms water, over sand and good holding ground, with Mount Direction bearing from 177° to 183° true. Good anchorage marks are Magada tree, in line with the chimney of the Sardine factory, bearing about 203° true, and Khandouri tower in line with the Telegraph buoy, bearing 95° true. A large vessel should keep Judios point open of the ruined fort, on Amaier point bearing about 284° true, and Europa point open of Malabata point. Small vessels anchor nearer the shore. The moorings of a coal hulk lie with the Battery light-

General charts 92, 142, 2717, 1, 2158a, 1226, 449.

Plan 1912, Tangier bay. Var. 14° 40′ W.

house bearing 267° true distant 8 cables, and are marked by a small cask buoy; vessels should not anchor in this vicinity. During the winter months vessels should be prepared to leave.

In an easterly gale, there is anchorage off a small beach about a mile southward of Malabata point, in 8 or 10 fathoms water, where the shelter is better than further westward, but caution is necessary to avoid the rock, Seuil du burj, and possibly other rocks near it. When working out of the bay and standing towards Old Tangier, Europa point open north of Malabata point leads northward of Bourée rock.

Prohibited anchorage.—Anchorage is prohibited eastward of a line drawn in a north and south direction through the buoy marked "Telegraph."

Tides and tidal streams.—It is high water, full and change, at Tangier point at Ih. 42m.; springs rise 8¼ feet, neaps 5 feet.

In the offing north of Tangier bay the westerly stream commences about 7 hours before high water, and the easterly stream about high water at Tangier. About 3 hours after high water at Tangier the stream in the bay runs to the westward, or in a contrary direction to the offing stream.

Northward of Tangier and the adjacent coast, the tidal streams are strong, causing eddies resembling breakers, however little sea there may be; this occurs more especially during springs. *See* also page 57.

Town (*Lat. 35° 47′ N., Long. 5° 48′ W.*). — The town of Tangier (Tanjah of the Arabs, and Tingis of the Romans), at the west side of the bay, and on the eastern slope of Marchan plateau, is enclosed by high walls; its houses are low, white, and flat-roofed, and the streets very narrow; the most remarkable objects are the mosque at the north-west angle of the town and a Saracenic castle named Kasba tower. Situated on the slope of the hill the town is visible from some distance, but it is shut in to the westward by Marchan plateau. Outside the walls and southward of the town are a number of European houses. The population in 1910 was estimated to be about 46,000, of whom 9,000 were Europeans, the remainder being Moors and Jews. It is the residence of Consuls-General and the Consuls of the principal nations, and of a few European merchants; it is also a favourite winter resort. The gates of the town are closed at sunset. For Climate, *see* page 16.

Communication.—The British lines serving Tangier are the Ellerman lines (formerly Papayanni Company), whose vessels sail from Liverpool to Egypt, and call on their way eastward, fortnightly; and the Royal Mail Steam Packet Company, who despatch vessels from London to Gibraltar and the Moorish ports also fortnightly,

General charts 92, 142, 2717, 1, 2158a, 1226, 449.

Plan 1912, Tangier bay. Var. 14° 40′ W.

whence they return by the Canary islands and Madeira. Thus there are no British steamers to convey passengers or cargo direct to the United Kingdom.

The steamers of Messrs. Bland & Co., and of Messrs. Mateos & Sons, of Gibraltar, run three times a week between Gibraltar and Tangier; but they both start on the same day as the Spanish mail steamer for their voyages in each direction; so there are three steamers from Tangier to Gibraltar on Mondays, Wednesdays, and Fridays, but none on the alternate days, and the same is the case on Tuesdays, Thursdays, and Saturdays as regards the passage from Gibraltar to Tangier.

The Correos de Africa has a subsidy for the regular service of mails to and from Cadiz and Algeciras on alternate days. For other steamship lines calling at Tangier, *see* page 15.

British and foreign courier posts are dispatched every week to the interior and coast ports.

Tangier has telegraphic communication.

Wireless telegraph (*Lat. 35° 47′ N., Long. 5° 48′ W.*). — A wireless telegraph station, open to the general public from 6 a.m. to midnight, has been established at Tangier. The call letters are C.N.W.

Trade. — The exports, consisting chiefly of oxen, slippers, eggs, goat skins, and ox hides, amounted in 1910 to £245,188; the imports, chiefly cotton and woollen goods, sugar, raw silk and silk goods, tobacco, wines and spirits, and hardware, amounted to £376,226.

Shipping.—In 1910, 1,338 steam vessels, with a total tonnage of 1,260,669 tons, entered the port, and 173 sailing vessels, with a total tonnage of 6,510 tons. The importation of opium, arms, and ammunition is prohibited.

Coal. — About 1,000 tons of coal are usually kept in stock, stored in a shed on the beach. Vessels are coaled by means of lighters, of which there are 13 of 16 tons each. Labour is plentiful, and 250 tons can be loaded in 24 hours, provided the lighters are available. Any strong wind, especially from east or north-east, prevents or impedes coaling.

Supplies.—Fresh meat, vegetables, and bread are plentiful under normal conditions, but notice must be given if any quantity is required. Good water can be obtained 2 miles inland, but has to be transported by donkeys and horses. Quantity, quality, and prices vary in different seasons and different years. There are wells on the beach, but the water is not good.

Repairs. — There is an engineering workshop, where slight repairs may be effected.

General charts 92, 142, 2717, 1, 2158a, 1226, 449.

Plan 1912, Tangier bay. Var. 14° 40′ W.

Hospitals.—Seamen are admitted to the French or Spanish hospitals, both of which are small.

Pratique. — Vessels receive pratique after entering the bay; a bill of health is always required. Vessels arriving after sunset may summon the pratique master by whistling more than three times; an extra fee is then charged.

No charges are levied on vessels of war, yachts, or merchant vessels taking shelter.

Chart 142, Strait of Gibraltar.

Coast. — From Malabata point the coast trends in an easterly direction for 3¼ miles, to Al Boassa point, and between is Altares point (*Lat. 35° 50′ N., Long. 5° 43′ W.*), which may be recognised by the triangular-shaped cliff at its termination; all this coast is high, steep, rocky, and commanded by high land. At about a mile eastward of Malabata point, and 3 cables off-shore are Peril rocks, a group of dark rocks, mostly above water, and about a cable northward of them, there is a sunken rock on which the sea frequently breaks.

Between Altares and Al Boassa point there is a slight indentation, with several small white sandy beaches separated by rocky points; of these Kankush point, which separates Cala Baja, a small bay, on the west, from Hermosa beach, on the east, is the most remarkable, and is situated about 8 cables eastward of Altares point. The coast is here bordered by a bank with several rocky heads, and the Caña Coja reef, which dries at low water, lies off Kankush point, the channel between being nearly a cable wide, with from 6 to 7 feet water. Fishing and coasting vessels find shelter, from strong easterly winds, by anchoring between the rocky points and close off these beaches. Kankush rivulet falls into the sea, a little eastward of the point.

Jaseur bank.—Jaseur rock, with 13 feet water over it, lies about 7 cables north-westward of Al Boassa point. There are other rocky heads inside it with from 4½ to 5½ fathoms water between, and Jaseur bank, between Al Boassa and Altares points, extends 1½ miles from the shore, with depths of from 6 to 9 fathoms over it, seaward of Jaseur rock.

Clearing marks. — Mount San Simonito open eastward of Al Boassa point, bearing 148° true, leads eastward, and Tangier town, its apparent length open northward of Malabata point, bearing 231° true, leads northward of Jaseur rock.

Phœnix bank, lying 1½ miles 349° true, from Altares point, has 8 fathoms water over it, and 4 cables southward of it is another bank, on which the depth is 9 fathoms; 2 miles northward of these banks the depths are over 100 fathoms.

General charts 92, 2717, 1, 2158a, 1226, 449

Chart 142, Strait of Gibraltar. Var. 14° 30′ W.

Tidal streams. — In the vicinity of Jaseur and Phœnix banks the tidal streams, running east or west, are nearly always strong. *See* Tide races, page 56.

Al Boassa point (*Lat. 35° 50′ N., Long. 5° 42′ W.*), the termination of high land which, at about 2 miles southward of it, attains the height of 905 feet above high water, is rocky and appears salient when seen from east or west, presenting then a bold headland. Reefs and detached rocks fringe the point, and at 2½ cables northward of it is a rock with 3 feet water over it.

Cala Grande. — At about 1¾ miles south-eastward of Al Boassa point is Cala Grande, a bay with a sandy beach more than half a mile in length; here small vessels, passing the strait from east to west, may anchor to wait the turn of the tidal stream, in 9 to 10 fathoms water, over sandy bottom, at half a mile from the beach. The bay affords no shelter except with off-shore winds.

Rio Ostras falls into the sea at the eastern end of the beach after flowing through an extensive valley; small but excellent oysters are found in the river, from which it takes its name. Mount San Simonito, 803 feet above high water, is situated 2½ miles southward of the beach and terminates in two peaks, the western being the most pointed; it can be distinguished by its form, from the high land around.

Coast.—From Cala Grande the coast, backed by high mountainous land, extends eastward for 4½ miles to Alcazar point, and is composed of sandy beaches interrupted by rocky points; at the distance of half a mile there are from 8 to 10 fathoms water, over generally rocky bottom with patches of sand.

Alcazar point projects northward, and is fringed with rocks. A river falls into the sea on the east side of the point, and on its right bank, near the mouth, are the ruins of Alcazar el Zaguer town.

A beach on the eastern side of the point, forms a bay, where there are from 4 to 6 fathoms water, which, but for the hostility of the Moors, would be a convenient place for small vessels to seek shelter from westerly winds.

Coast.—From the above bay, the coast, chiefly consisting of cliffs with sandy beaches interrupted by rocks, trends to the north-eastward for 3½ miles to Sainar point, which is low and projects slightly. A ruined tower is situated on the coast at a mile eastward of Alcazar point, and near the mouth of a stream; at a third of a mile from the coast there are from 7 to 9 fathoms water.

Cires point is 1¾ miles north-eastward of Sainar point, and rocks extend a quarter of a mile off it, and between the two points is R'Mel

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Chart 142, Strait of Gibraltar. Var. 14° 30′ W.

bay; in the southern part of the bay is a fine sandy beach. South-west of the sandy beach, the River R'Mel falls into the sea after winding through a deep valley a little eastward of Sainar point.

From Cires point the land suddenly rises to 740 feet above high water, and forms a remarkable hill extending north and south, known as Cuchillo de Cires, which when seen from certain positions bears some resemblance to Gibraltar. At about 3½ miles southward of Cires point is the blunt summit of a mountain (Round summit), 1,561 feet above the sea, visible from nearly every part of the strait.

Lanchones point (*Lat. 35° 55′ N., Long. 5° 28′ W.*), a mile eastward of Cires point, is high and bluff, with a rocky base, the land a mile within it being 1,161 feet above the sea. Cires bay, between the two points, is about half a mile deep, with a sandy beach and deep water off it. The coast between Lanchones and Cruces points forms a bold front for three-quarters of a mile; it is shallow close in, but at a distance of half a mile there is a depth of 100 fathoms; the current here is very strong.

Almanza bay, between Cruces and Almanza points, is about half a mile wide, 4 cables deep, with a small sandy beach. The anchorage for small craft, in the middle of the bay, in 3 and 4½ fathoms water, over sandy bottom, is one of the best on this part of the coast. A small stream flows into the bay after passing through a long narrow valley, in the middle of which is a remarkable conical height with its rocky summit crowned with verdure. Almanza point has a level summit, is bold, clear of danger, and remarkable; it rises from the sea like a wall.

From Almanza point a high rugged coast continues eastward for a mile, and then turns north-eastward for a similar distance to Leona point.

Peregil or Coral island lies midway between Almanza and Leona points, and at the base of the Sierra Bullones or Apes hill, with the land of which it appears to be blended. The island, nearly triangular in shape, is about 3 cables across, and 243 feet high; it is entirely rock, and steep, but covered with shrubs, presenting to the northward cliffs of the same colour as the rugged height of Bullones, from which it is separated by a channel, 1½ cables in width and full of rocks. Sea birds build on the island, and their eggs are to be found in great abundance.

The western side of the island is bold, there being depths of from 11 to 22 fathoms close to it. On its eastern side there are two coves, the northern named Rey or Levante, and the southern Reina; they are only suitable for small vessels. There are other insignificant coves on

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the north and west, where landing, which is somewhat difficult, may be effected, should it be desired to reach its summit for any purpose, or to obtain fuel.

It contains a cave named Palomas, in which 200 men could find shelter; there are the remains of a tower at the entrance to Reina cove, and the commencement of a cistern, the work probably of the Portuguese and of the time of the conquest of Ceuta.

Peregil rock (*Lat. 35° 55′ N., Long. 5° 25′ W.*).—A reef extends a short distance from the north-east extremity of the island; and a rock, which scarcely uncovers at low water, spring tides, lies rather more than a cable about north-eastward from it, with a depth of 5 fathoms between it and the island. Another rock, with 3¼ fathoms water over it, lies eastward of the former, at a distance of 2½ cables from the north-east point of the island, there being a depth of 22 fathoms between them.

Anchorage.—Between Peregil island and the mainland there is good sheltered anchorage for small vessels both from easterly and westerly winds, in from 6 to 8 fathoms water, and the island would be resorted to but for the aggressiveness of the Moors. Smuggling craft and fishing vessels, in bad weather, are all that frequent it.

Water.—There is water on the mainland opposite the island, and fuel may be obtained from the shrubs which abound on the island; but as landing is prohibited, in a case of urgent necessity great caution would be required to obtain either. *See* Caution, Landing, page 110.

Leona point, the north extreme of the south shore of the strait, projects northward from the high range of the Bullones; it is high and level, terminates in cliffs, and can be seen from a great distance. The point is very bold, there being a depth of 200 fathoms a quarter of a mile off.

Sierra Bullones or Apes hill (Monte de las Monas) (*see* views, pages 86, 122).—The Jebel Musa of the Moors and Abila of the ancient Romans is very remarkable, and with Gibraltar, well marks the eastern entrance to the strait. Sierra Bullones, rugged and precipitous, ascends in a series of sharp cliffs to many peaks, one of which reaches the height of 2,808 feet, and commands the whole chain of mountains on the coast between Cires and Blanca points.

This mountain, and Gibraltar, known as Calpe, were named by the ancients The Pillars of Hercules, and, in early ages, were considered by the inhabitants, eastward of them, as the western boundary of the world.

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Benzus bay.—The coast between Leona point and Punta Blanca, 1¾ miles eastward, forms a bay more than half a mile deep, which is bounded on the west by high inaccessible cliffs terminating in Leona point, and on the east in high land. The land at the head of the bay rises rapidly in terraces one above the other, on some of which are the remains of towers and buildings.

Anchorage.—In case of necessity, with winds from East, through south, to West, small vessels will find anchorage here, close to the shore.

Plan 2742, Ceuta bay.

Punta Blanca, high, steep, and of a dark reddish colour, has a ruined tower on it, and some rocks at its foot.

Benzus rock, lying 315° true, distant 5½ cables from Torre Blanca, and 4 cables from the shore, is a rocky shoal, with 2¼ fathoms over it, and 6½ to 10 fathoms around, except to the south-westward, where the shoal water extends about a cable. Between it and the shore the space is encumbered with rocks, which extend from the east point of Benzus bay.

Susan rock, having a depth of 2½ fathoms over it, lies 0° true, distant about 3¾ cables from Blanca tower, is about 20 yards in extent, and has 6½ to 9 fathoms water close around it.

Melita rock, situated 47° true, distant 3 cables from Torre Blanca, is of small extent, and has a depth of 2 fathoms over it.

The space, between the eastern cliff of Benzus bay and Punta Blanca, within these shoals, is foul.

The whole of the walls of ancient Ceuta open of Punta Bermeja, bearing about 144° true, leads eastward of these shoals.

Punta Bermeja (*Lat. 35° 54′ N., Long. 5° 21′ W.*), about a mile south-eastward of Punta Blanca, derives its name from the reddish colour of the land, and has on it the ruins of a tower. The coast between is high and cliffy; rocks, above and below water, extend nearly 2 cables from it. Calamocarra or Rahma islets, situated 3½ cables south-eastward of Punta Blanca, extend about 1½ cables northward from the point of the same name and form a natural jetty.

Marabut mount, about 8 cables southward of Calamocarra point, has several breaks and fissures, more or less deep, and its slopes to the sea are covered with wood. A conspicuous white marabut tower, about 36 feet high, stands on its summit, 1,115 feet above high water, and is known as Renegado (Rebel) fort; upon the hill to the southward are several Spanish redoubts, and on the eastern slope towards the boundary, are other batteries, a mosque, &c.

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Plan 2742, Ceuta bay. Var. 14° 20′ W.

CEUTA BAY (*see* view facing page), formed between Punta Bermeja and Santa Catalina point, about 2¾ miles eastward, is a mile deep, but affords no shelter for large vessels except from southerly to south-westerly winds, as fresh south-easterly winds cause a considerable sea, and with those from the westward there are heavy squalls from the mountains. No vessel should seek shelter in this bay, especially with easterly or westerly winds having any northing in them. At 1¼ miles from Punta Bermeja is Benitez point low with reefs extending from it; between the two points the coast forms a bend with sandy beaches, interspersed with rocks extending off a short distance.

Ceuta isthmus. — The eastern slope of the Marabut mountain descends gradually eastward, and continues narrowing until it becomes a mere tongue of low land, a little more than a cable across, forming Ceuta isthmus. The old town of Ceuta surrounded by the walls of old fortifications, all in ruins, is situated about half a mile westward from the western end of the isthmus, and on the slope of the hill. At the western end of the isthmus are the principal fortifications, which defend the land approach and are separated from the present town by a dry ditch cut across the isthmus; this ditch opens on to a boat camber at its north end, and on to the beach at its south end.

Almina peninsula, with a maximum width of 8 cables, extends about 2 miles east-north-east from the isthmus, and is composed of seven small hills, which ascend gradually to the highest and largest, named El Hacho, on the summit of which is the fort of the same name, conspicuous, and 665 feet above the sea.

Santa Catalina point, the eastern extreme of Ceuta bay, projects northward from Almina peninsula, is low, surrounded by rocks and reefs, and a fort of the same name commands it. The rocks off the point are high, and extend about 1⅓ cables to the northward; on the largest rock, named Santa Catalina island, is a fort connected with the mainland by a bridge. Santa Catalina point bears 168° true, distant 12½ miles from Europa point.

Almina point, the eastern extreme of the Almina peninsula, is low, but the land rises quickly within it. The point is commanded by a battery, and a little southward of it, on the summit of Mosqueros hill, is the light-tower.

LIGHT (*Lat. 35° 54′ N., Long. 5° 17′ W.*).—On Mosqueros hill a white circular tower, 48 feet in height, exhibits, at an elevation of 485 feet above high water, a *fixed* and *flashing white* light, giving *one* flash *every minute*; the *flashing* light is visible in clear weather from a distance of 23 miles, and the *fixed* light 19 miles. The intensity of this light was reported (1912) to have been considerably increased.

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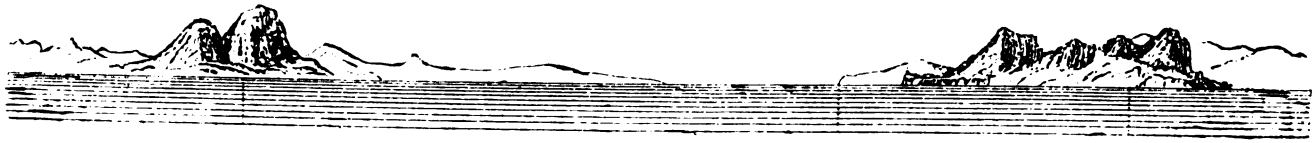
Frailecito point. *Mount Spartel.* *Cape Spartel*, 170° *true, distant about* 5 *miles. Jebel Djebila (Mount Nipple).*

Lighthouse. Cape Spartel 100° *true.* *Spartel bay. Mount Spartel.*

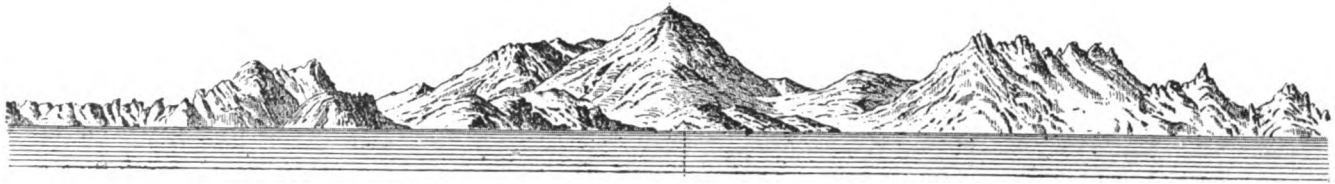
Santa Catalina. *El Hacho.* *Sierra Bullones.*

Ceuta from the northward.



Sierra Bullones, bearing 216° *true.* *Europa point, bearing* 242° *true.* *Gibraltar.*

Strait of Gibraltar from the eastward.



Estepona. *Sierra de Marbella.*
Sierra Bermeja, bearing 330° *true, distant about* 20 *miles.*

Plan 2742, Ceuta bay. Var. 14° 20′ W.

This light and that on Europa point mark by night the eastern entrance to Gibraltar strait.

Fog signal.—A fog gun *every five minutes* is fired on the Plaza at Ceuta. The gun is fired midway between the periods of the explosive fog signal made from Europa point lighthouse, thus:—Europa point, two reports in quick succession; interval, *two and a half minutes;* Ceuta, one gun; interval, *two and a half minutes;* Europa point, two reports in quick succession; interval, *two and a half minutes;* Ceuta, one gun.

On fog setting in at Ceuta the fog-gun will be fired regularly once *every five minutes*, even if the fog signal at Gibraltar is not heard.

As soon as the Gibraltar signal is heard the gun at Ceuta will be fired midway between the Gibraltar signal.

Depths off-shore.—At the distance of 4 cables from Santa Catalina point, the depths vary from 11 to 23 fathoms, over rocky bottom, and there are above 100 fathoms at three-quarters of a mile eastward of the peninsula.

DANGERS.—Campo rocks.—A shoal spit extends 2 cables northward from Benitez point; at its outer end is a sunken rock, which nearly always breaks, and within it a chain of rocks, above and below water, with depths of 5 and 10 feet between them, extends 1½ cables from the point. At about 3½ cables 18° true from the point is a patch of 4 and 5 fathoms. Shoal water is said to extend nearly half a mile from the point.

Isabel bank (*Lat. 35° 54′ N., Long. 5° 18′ W.*), with 3 feet of water over it, lies 1⅓ cables northward of the rocks off Santa Catalina point, and shoal water extends outside the 3 feet, there being a depth of 5½ fathoms 1⅓ cables northward of it. In heavy seas the tidal streams, setting over the bank, form a violent race.

Harbour works.—An artificial harbour is under construction in Ceuta bay, between Torre Las Heras and a position about 100 yards westward of Government house. It will consist, on the northern side, of a mole running out from Torre Las Heras towards Campo rocks for a distance of about 680 yards, and then curving to the south-westward for another 500 yards. This has been completed for a distance of about 800 feet from the inner end.

The southern mole will run out on a bearing of about 25° true for a distance of about 380 yards, and then curve to the eastward for a short distance. This has been completed for a distance of about 80 yards from the inner end. The area enclosed will have a depth of from 9 to 3 fathoms beyond a cable from the shore. A stone landing pier is also in course of construction.

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Plan 2742, Ceuta bay. Var. 14° 20′ W.

Caution.—Vessels should not attempt to cross the position of the moles under construction, as shown by dotted lines on the plan. There are depths of less than 6 feet of water over some blocks at the end of the North mole. The depths along the moles are considerably less than as shown on the plan.

Lights.—A *fixed green* light, visible from a distance of 2 miles, is shown, at an elevation of 21 feet above the sea, from a post 16 feet in height, situated 55 yards within the extremity of the northern mole under construction, and moved seaward as the work progresses.

This light is, however, generally obscured by lights shown from the crane at the outer end of the works.

The electric lights of the town are visible from seaward.

Mooring buoys. — A white mooring buoy, for the use of the Algeciras mail steamer, lies about 1¾ cables northward of the proposed end of the southern mole, and another buoy of the same description for use as a breast-fast for vessels alongside the North mole, lies about 1½ cables south-westward from Torre Las Heras. There are also four other mooring buoys inside the harbour, but they have to do with the works, and are moved as necessary.

Buoys. — The outer extremity of the works in progress at the North mole are marked by two buoys, which are moved seaward as the work advances. There is also a buoy, on the south side of the bay, marking the telegraph cables to Tangier, Estepona, and Penon de Velez.

Anchorage (*Lat. 35° 53′ N., Long. 5° 19′ W.*). — The best anchorage in Ceuta bay is north-westward of the middle of the new town in from 10 to 11 fathoms water, over sand and rock. Obispo street, the principal thoroughfare, which begins on the northern side of the Governor's house, the most conspicuous at the western end of Almina, should be kept open; the belfry of San Francisco church, at the higher end of the street, may assist in recognising it.

A vessel should not go further in than to have Campo rocks in line with Mount Marabut tower bearing 270° true, and should be prepared to leave if it blows hard from the east or west. The mail steamers which run between this place and Algeciras make fast to buoys.

Directions.—A sailing vessel leaving Ceuta bay for Ensenada de la Almadraba on the south side of the isthmus, on account of north-west winds, should endeavour to get under way at half flood, and having cleared Isabel bank follow the coast at a moderate distance, so as to keep in the steady breeze, and to guard against the eddy current, which sets towards the land.

Tides.—It is high water, at Ceuta, full and change, at IIh. 6m.; springs rise 3¾ feet, and neaps 2½ feet.

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Plan 2742, Ceuta bay. Var. 14° 20′ W.

Tidal streams.—The westerly stream commences about 7 hours before high water, and the easterly stream about high water at Ceuta. *See* also page 55.

Ceuta town, the Septa of the Romans, and Sebta of the Moors, occupies the lowest and narrowest part of the isthmus. The modern town, or Almina, occupies the northern and western slope of the peninsula, and its houses are surrounded by gardens with shrubs and trees; it is clean, and well built in the Spanish style, with spacious streets.

This important fortress, one of the keys of the strait, was gained by Don Juan I. of Portugal, who took it from the Mahumedan power in 1415, but since the revolution of 1640, when the Portuguese detached themselves from Castile, it has remained in the hands of the Spaniards, who have been increasing their fortifications, and converting it into another Gibraltar.

The population, including the garrison and convicts, is about 13,000. The gates of the town are closed at 8 p.m., and special permission is necessary to communicate with the interior during the night.

Communication.—Daily communication by steamers with Tangier, Algeciras, and Gibraltar; telegraphic communication with all parts.

Submarine telegraph cable.—Ceuta is connected with Estepona, with Tangier, and with Penon de Velez de la Gomera by submarine cables.

Supplies.—Fresh meat, of not particularly good quality, may be obtained; game, poultry, and fish are abundant and cheap; vegetables are scarce. Water, only procurable from cisterns and wells, is expensive and the supply very limited.

Life-saving.—A lifeboat and rocket apparatus is maintained at Ceuta.

Desnarigado point (*Lat. 35° 53′ N., Long. 5° 16′ W.*), situated 4 cables southward of Almina point, is the south-east extreme of the peninsula, and between it and Sachal bay the coast is steep.

The description of this coast is continued on page 286.

Chart 142, Strait of Gibraltar.

DIRECTIONS.—Gibraltar strait, West to East.—Steam vessels, or sailing vessels with a fair wind, through the strait, should keep in mid-channel, in order to take advantage of the easterly current. *See* view, page 86.

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Chart 142, Strait of Gibraltar. Var. 14° 20′ W.

Working through.*—A sailing vessel with an easterly wind should work in mid-channel whilst the west-going tidal stream is running, but with the east-going tidal stream either shore may be approached, with a chance of meeting with favourable slants of wind; if it be blowing fresh, a vessel will (especially if she be able to gain the meridian of Cape Plata or Malabata point) get through the strait, provided she keep in mid-channel and can carry at least her topsails (even close reefed). When Tarifa is passed, the force of the wind lessens. If the easterly wind is so strong as to prevent a vessel carrying sail, shelter should be taken under Cape Spartel, keeping under easy sail to await a favourable change. *See* Jeremias anchorage, page 110.

Coasting vessels, which keep the Spanish shore on board, reach Tarifa easily, availing themselves of the tidal streams, and anchoring off the Lances de Tarifa (*see* page 87), if the wind be too strong to admit of their keeping under sail. When the easterly wind inclines to the northward, it is advisable to keep on the Spanish coast, avoiding Pearl rock (*see* page 92), but when to the southward, the African coast is preferable.

East to West.—In a steam vessel, or a sailing vessel with a fair wind, attention should be paid to the tidal streams, closing either side of the strait, the Spanish being preferable, and following it with the object of keeping as much as possible out of the easterly current. *See* view, page 122.

A sailing vessel, unless with a commanding breeze, should not approach the projecting points, such as Carnero, Acebuche, Tarifa, Cires, &c.; and in light winds it may be advisable to anchor.

Working through.*—The passage through Gibraltar strait from east to west against the general easterly current from the Atlantic is, even with a fair wind (especially during neap tides), somewhat difficult for sailing vessels, but with westerly winds, which increase the strength of the current, it is, for a large vessel, almost impossible. Some instances are known of vessels of war having achieved it, but these cases, favoured by circumstances, are rare.

From Europa point, vessels should work along the coast of Spain during the west-going tidal stream until reaching Tarifa, where, if necessary, they should anchor to await the next favourable stream. If from Algeciras, they should get under weigh at half ebb, and so reach Acebuche point by the commencement of the west-going stream.

A vessel having succeeded in passing Tarifa by keeping the Spanish coast, should work up in the bay to the westward, while the tidal

* *See* Winds, page 37, and Tidal streams, page 55.

Chart 142, Strait of Gibraltar. Var. 14° 20′ W.

stream remains favourable, when, gaining Peña tower, if not intending to work inshore of the Cabezos shoals, it may be preferable to cross to the African coast, and there work up as below directed.

If the wind be S.W. with moderate weather, the Spanish coast should be kept, as by crossing to the African coast, where the wind will probably be less, a vessel will be set to leeward. Should the wind shift to W.N.W. or N.W. the Spanish coast should still be kept. (To avoid the Cabezos shoals, *see* page 86.)

If a vessel cannot reach Tangier, by following these directions, she should cross to the African coast and work up on that side, with the favouring stream, anchoring, when necessary, until Tangier bay is reached. But Tarifa should be fetched before standing across, otherwise there will be no certainty of weathering Cires point, and should a vessel fall to leeward of it, it will be difficult even to regain Gibraltar bay.

Having weathered Cires point (*Lat. 35° 54′ N., Long. 5° 29′ W.*), work within the counter current and near the coast to take advantage of any slant of wind that may occur, and then doubling Malabata point, gain Tangier bay, whence it will be easy to regain the Spanish coast. When the meridian of Tangier is passed, there is less current and a more manageable wind than in the narrows.

With westerly winds, a small vessel making Almina de Ceuta instead of Europa point, may work up on the African coast within the limits of the tidal streams, anchoring during the east-going stream.

From southward of Ceuta to Gibraltar work up as far as Cires point, then taking advantage of the west-going stream, cross the strait, sailing a point free. If the wind is S.W. this is more easily done, with the favourable slants of winds met with on the African coast.

Plan 144, Gibraltar.

East coast of Gibraltar.—The east coast of Gibraltar is steep and inaccessible; there are depths of less than 5 fathoms from 1½ to 3 cables off it. *See* also page 109.

Plan 144 and chart 1448.

SPAIN, SOUTH COAST.—Bahia Mala or **Blackstrap bay.**—Between Devil's Tower, at the north end of Gibraltar, and the Torre Nueva, is a sandy beach, where may yet be seen the remains of Fort Santa Barbara. The shore is clear of danger; depths of 8 to 12 fathoms water, over sandy bottom, are found at the distance of half a mile, and 25 fathoms at one mile.

Sailing vessels should not anchor in this bay with east or south-easterly winds, as there is not only a difficulty in getting out of it,

Plan 144 and chart 1448. Var. 14° 20′ W.

should it blow from this quarter, but the weather becomes thick and objects difficult to distinguish. For tidal streams, *see* page 55.

Torre Nueva stands on a point of little elevation, and from it commences another beach, skirted by rocks at a short distance, which extends 2½ miles north-eastward, terminating in a point of reddish rocks, higher than the former, on which is Torre Carbonera.

Chart 1448, Acebuche point to Chullera point, &c.

Rio Guadiaro, about 3 miles north-eastward of Torre Carbonera, enters the sea at a sandy beach with some rocks. It rises in the mountains of Ronda, and separates the provinces of Cadiz and Malaga. Although swollen in winter from its numerous tributaries, in summer small vessels can scarcely cross the bar at high water, but within the water deepens, and there is a good shelter from all winds. A tower is situated, on a small sandy hill, at a quarter of a mile from its mouth, and near it are lagoons connected with the river.

Sardina cove (*Lat. 36° 18′ N., Long. 5° 15′ W.*). — Cape Sardina or Chullera point, about 2¼ miles north-eastward of the Rio Guadiaro, projects to the eastward, and Heroe rock, with 10 feet over it, lies about 2 cables off the point; the depths vary from 3½ to 20 fathoms within 4 cables of the point. Between the river and the point is Sardina cove, with a sandy beach interspersed with rocks, and west of the point small vessels obtain sheltered anchorage from moderate easterly winds, but they anchor close to the shore. On the ridge of Cape Sardina is Torre Chullera.

Plan of Sabinilla anchorage on 1588.

SABINILLA ANCHORAGE. — From Cape Sardina, the coast becoming gradually higher trends to the northward for 2½ miles to Sabinilla castle, which is of a reddish colour, and situated about one cable from the beach; south-westward of it is Torre Duquesa. The shore is sandy and scattered with rocks, of which some are uncovered; Alcorin rock, the most important, lies nearly a cable from the beach and southward of Sabinilla castle.

Nearly 2 miles north-eastward of Sabinilla castle is Torre del Salto de la Mora, also known as De la Sal, standing on a rocky point of regular height, with some islets or rocks off it, the outer, 1⅓ cables south-eastward of the point and named Laja del Salto de la Mora, although covered at high water, the sea always breaks on it, and it should be given a good berth.

Anchorage. — Although the coast generally, as far westward as Bahia Mala, affords anchorage with winds from south-west, through west, to north, Sabinilla anchorage, being farther to windward, should the wind shift to the south-eastward, is the best. Small vessels anchor

General charts 3578, 773, 92, 2717, 1, 2158a, 449.

Plan of Sabinilla anchorage on 1588. Var. 14° 20′ W.

south-eastward of Torre Duquesa, and not far from Alcorin rock. Steam vessels anchor in 5 fathoms water; sailing vessels should be in a depth of 8 fathoms, with the high chimneys of the tile works bearing 256° true, and Gibraltar seen open of Sardina point.

This anchorage should be left immediately the off-shore winds cease, as a levanter may then be expected. This will be known by the accumulation of light clouds on the mountains and other prognostics (*see* page 38). A levanter may be expected immediately should a north-westerly wind shift to the northward; usually it commences from the north-eastward, when the anchorage should be left at once, though at times it comes on suddenly.

San Luis. — The town of San Luis or Manilva, which contains 3,238 inhabitants, stands on moderately high land, about 1¼ miles south-west of Torre del Salto de la Mora, and the Manilva, a small river, enters the sea between them; other small streams debouche here.

Supplies. — Fresh provisions may be obtained at San Luis, and water can be procured from Estanquino brook; it is the best on the coast, and easily obtained.

Plan of Estepona anchorage on 1588.

Coast. — Between Salto de la Mora and Punta de Ilfaro or de la Sal Vieja, a distance of 3 miles, is Punta Aroya Vaquero, on which is a tower. Sal Vieja also has a tower and a guard-house, and rocks extend for about a cable southward from the point; Roquero de Alfaro, a rocky patch, with depths of 5 to 7 fathoms over it, lies 4 cables in the same direction.

ESTEPONA ANCHORAGE. — Between Punta de la Doncella, 4 cables westward of Sal Vieja, and Mármoles, or de Pinillos, points, is Estepona anchorage, clear of rocks, with 4 fathoms water at 3 cables from the shore, which gradually increases to 15 and 17 fathoms, at a distance of a mile.

LIGHT (*Lat. 36° 25′ N., Long. 5° 9′ W.*).—On Punta de la Doncella or de la Peñas, close to the coast, is a grey cylindrical tower, 28 feet in height, which exhibits, at an elevation of 59 feet above high water, a *fixed* and *flashing white* light *every four minutes*, which is visible in clear weather, from a distance of 13 miles.

Punta de los Mármoles (Pinillos), at the north-eastern extreme of Estepona anchorage, is low and rocky, and a reef, on which there is a depth of 10 feet at low water, projects about 2 cables southward from Punta de la Plata, 3 cables to the eastward. Seaward the depth gradually increases to 10 fathoms, at half a mile from

Plan of Estepona anchorage on 1588. Var. 14° 20′ W.

the point, and to 20 fathoms at a mile distant. Large vessels should be careful to give this point a good berth.

Anchorage.—The best anchorage off Estepona is in 6½ fathoms water, with the convent tower (the highest in the town) in line with Sierra Bermeja, bearing 320° true; in this position the rocky bottom in the roadstead is avoided.

Small vessels anchor off the beach, with off-shore winds in 14 or 15 feet water, but the roadstead should be left the moment there is any indication of a change. Country boats run upon the beach.

The town of Estepona, with 9,397 inhabitants in 1909, is close to the beach, and the small river Monterrojo, which rises in the Sierra Bermeja, enters the sea westward of the town. The exports consist of fruit and wine; and in the neighbourhood are some valuable lead mines. There is a service of motors from Estepona to Malaga.

Submarine telegraph cable.—Estepona is connected with Ceuta by a submarine cable.

Supplies in small quantities may be obtained, also water; partridges and wild fowl may be shot in the vicinity.

Chart 3578, Eastern approach to Strait of Gibraltar.

Sierra Bermeja (*Lat. 36° 29′ N., Long. 5° 12′ W.*), one of the most important marks for this part of the coast, commences to rise, about 3 miles from the coast, to a rocky peak, 4,728 feet high, on which are the remains of Moorish fortifications. This peak is easily distinguished at a great distance; from its being the highest mountain east of Gibraltar it is well defined when seen from the southward. *See* view, page 122.

Coast.—Torre Padron stands on a hill a short distance eastward of Punta de los Mármoles, the shore between being rocky. Guadalmaza point and tower are situated 4 miles from the town of Estepona, and between Torre Padron and Torre Guadalmaza there is a bay which is clear of danger except on the western side, where the rocks extend a short distance off, and a little beyond which is Torre Albelerin, standing on a sandy eminence half a cable from the coast.

Guadalmaza point is sandy, and from it a tongue projects about half a cable, having little water on it. Torre Guadalmaza is square, and stands on a plain 2 cables from the point. A factory, with one high chimney, is situated 3 cables north-westward of the tower. To the eastward of the point the little Rio Guadalmaza, rising in the Sierra Bermeja, and having always an abundance of water, falls into the sea.

Baños point, low and rocky, is 2½ miles eastward of Guadalmaza point. Torre Saladillo is 1½ miles eastward of Guadalmaza point, there is a small wood at a short distance inland from Torre Saladillo;

General charts 773, 2717, 1, 2158a, 449.

Chart 3578, Eastern approach to Strait of Gibraltar. Var. 14° 10′ W.
Torre Baños stands about a quarter of a mile from Baños point: a conspicuous wood extends for about 3 cables, parallel with, and near, the coast, immediately westward of Torre Baños. The land in the interior continues high, and Monte Mayor, a remarkable pyramidal hill, 1,870 feet high, lies about 3½ miles northward of Torre Saladillo; on its summit are the ruins of a castle, which assists in distinguishing this part of the coast.

Bóvedas bank.—Torre Bóvedas is situated 1¼ miles eastward of Baños point; a factory, with two high chimneys, is situated about 3 cables westward of the tower; between the tower and Guadalmaza point the shore is a clean sandy beach, with about 6½ fathoms water at half a mile from it. Bóvedas bank, formed of sand and rock, with 11 fathoms water on the shoalest part, lies 3½ miles southward of Bóvedas tower. From this depth the water gradually increases seaward, and at 2 miles to the southward there are 87 fathoms water; but between the bank and the coast the depths vary from 14 to 22 fathoms.

Coast. — Ladrones point and tower lies about 12 miles eastward from Bóvedas point, forming between Marbella bay. In this distance there are several towers near the coast, viz.:—San Pedro de Alcantara, del Duque, Alarcon, Real, Zaragoza, and Lance de las Canas.

Plan of Marbella anchorage on 1588.

MARBELLA. — The town of Marbella, containing in the year 1909 a population of 9,629, stands 2 cables from the sea, and is conspicuous. A British Vice-Consul is resident. From off the south side of the landing-place an iron pier extends from the shore about 350 yards; it is about 50 feet in width, and at the head there is about 4 fathoms water, gradually decreasing to 12 feet at half the distance in. There are strong bollards along the pier, and two mooring buoys abreast them on either side, to which vessels are secured.

This pier or mole is connected by rail with some extensive iron mines about 3½ miles inland, and near the beach are some buildings for the reception of iron, and other mineral produce.

LIGHTS (*Lat. 36° 30′ N., Long. 4° 53′ W.*). — About 300 yards westward of the pier, and 65 yards from the sea, is a grey conical tower, 39 feet in height, which exhibits, at an elevation of 51 feet above high water, a *fixed white* light, which is visible, in clear weather, from a distance of 11 miles.

From an iron post, 6 feet in height, at the end of the iron mole, a *fixed red* light is exhibited, at an elevation of 30 feet above high water, which, in clear weather, is visible from a distance of 8 miles.

General charts 2717, 1, 2158, 449.

Plan of Marbella anchorage on 1588. Var. 14° 10′ W.

Anchorage. — With off-shore winds the best anchorage is in 9 fathoms water, with the lighthouse bearing 9° true, distant about 4½ cables.

Coal and supplies. — About 4,000 tons of coal are imported annually for sugar refining and mining operations, but the amount kept in stock is not known. Supplies of fresh provisions and fish may be procured, and water obtained from several streams near the beach, and particularly from a spring named Fontanilla.

Trade. — The only articles exported from Marbella are iron ore and oranges; the chief imports are steel rails, coal, and machinery. In 1910, 40 steam vessels, with a total tonnage of 34,651 tons, entered the port, and 77 Spanish sailing vessels, with a total tonnage of 3,439 tons.

Chart 773, Gibraltar to Adra.

Sierra de Marbella, about 3½ miles northward of the town, is not so high as the Sierra Bermeja, and is distinguished from it by being more extended in an east and west direction, and by the summit, which reaches 4,039 feet, being more irregular. It slopes nearly down to the coast. The Sierra, and its eastern peak, named Juana (3,884 feet), form excellent marks for the offing. *See* view, page 122.

Calaburras point, 5½ miles eastward of Ladrones point, has a tower on it, and is skirted with rocks at the distance of a cable; between the points are the towers of Calahonda, Pesetas, and Cala Moral, where the coast forms a bend which has a sandy beach.

LIGHT (*Lat. 36° 30′ N., Long. 4° 38′ W.*). — On Calaburras point, south of the tower, and 70 yards from the sea, is a grey pyramidal tower, 44 feet in height, with a red and yellow tipped lantern, which exhibits, at an elevation of 116 feet above high water, a *fixed* and *flashing white* light *every three minutes*, and visible in clear weather from a distance of 16 miles. *See* view, page 134.

Sierra Mijas, about 6 miles northward from Calaburras point, rises to a height of 3,789 feet. (*See* views, page 134.) Approached from the eastward it appears blended with the Sierras Marbella and Bermeja, but the white buildings of the town of Mijas, nearly halfway up the mountain, appear like a white horizontal band.

Fuengirola castle (*see* view, page 134) is situated 1¾ miles north-eastward of Calaburras point, and between Calaburras point and a point about half a mile south of the castle the coast is rocky; from this to Torre Blanca, about 2 miles further north-east, it is clean sand. The town of Fuengirola, with about 6,000 inhabitants, most of whom are fishermen, stands at the foot of the Sierra Mijas, and about a mile northward of the castle.

General charts 2717, 1, 2158a, 449.

Chart 773, Gibraltar to Adra. Var. 14° 10′ W.

Anchorage.—The shore off Fuengirola is clear of danger, except a rocky head, having 2¾ fathoms water over it, lying a cable eastward of the point, half a mile southward of the castle; this point is also surrounded by rocks. With north-westerly winds there is excellent anchorage for all classes of vessels off this coast, and the anchorage may be easily left should the wind suddenly shift; the best berth for large vessels is in 10 or 12 fathoms water, with the castle bearing 230° true. Smaller vessels anchor nearer the shore in depths of 6 or 7 fathoms.

Supplies, with the exception of bread and fish are not abundant; water may be obtained from a river which runs into the sea a little north of the castle.

Coast.—Torre Bermeja is about 6¾ miles north-eastward of Fuengirola castle, and between are the towers of Blanca, Benalmadena, and Quebrada. About 3 cables southward from Torre Bermeja is Laja de Bermeja, a rocky bank, with a depth of 8 feet over it, and although the sea nearly always breaks, several vessels have struck on it.

Plan of Torremolinos anchorage on 1588.

Torremolinos point (*Lat. 36° 37′ N., Long. 4° 30′ W.*) is slightly salient, rocky, and of no great elevation, has a ruined castle on it, and half a mile northward, on the slope of the Sierra Mijas, is the small town of Torremolinos, with about 2,500 inhabitants, most of whom are employed in the fishery; the town is conspicuous from the eastward.

Anchorage.—From Torremolinos point the shore northward to Malaga, a distance of 8 miles, is a clean sandy beach, off which anchorage may be obtained with westerly winds, in any convenient depth, but a good berth for a large vessel is eastward of Torremolinos castle in from 15 to 18 fathoms water; small vessels in depths of from 8 to 10 fathoms.

This anchorage is much frequented by vessels bound through the Strait of Gibraltar, and meeting with strong westerly winds, when it is difficult to get round Calaburras point, off which the current sets strongly to the eastward. Vessels should leave when the wind shifts to the eastward.

Supplies of bread, water, &c., in small quantities, may be obtained here.

Chart 773, Gibraltar to Adra.

Coast. — Between Torremolinos and Malaga, the land is low and level, rising in the interior, until reaching the mountains which surround Malaga. The town of Churriana is situated nearly 2 miles from the coast, and other villages and houses, as well as the several factories and foundries extend along the coast towards Malaga.

General charts 2717, 1, 2158a, 449.

Chart 773, Gibraltar to Adra. Var. 14° 10′ W.

The Rio Guadalhorce, the Saduca of the Romans, rises in the Sierra de Jorge, and after receiving the waters of many small streams and fertilising extensive lands, enters the sea nearly 4 miles north-eastward of Torremolinos castle. It has little water on the bar and shallow water extends about a mile from it, which should be given a wide berth by vessels running along the coast, bringing Malaga light to bear about 18° true and keeping the lead going.

MALAGA BAY, formed between Torremolinos and Cantales points, 11 miles to the eastward, is 3 miles deep, and affords excellent shelter from westerly winds. Southerly and south-westerly winds seldom blow home during winter, those from the north-westward being most common at the head of the bay, whilst it may be blowing hard from south-westward in the offing, so that a vessel, having strong south-westerly winds off Calaburras and Torremolinos points, may safely run towards Malaga, and anchor where convenient.

The bay however is exceedingly dangerous with strong south-easterly winds, which send in a heavy sea, and if unable to enter Malaga harbour a sailing vessel will have difficulty in getting out of the bay.

Landmarks. — The Sierra Mijas, with that of Benalmadena, about 3 miles eastward of it, are both south-west of the city; another chain, named the Mountains of Malaga, extend eastward, with their base near the sea; and the peaks rising from the Cerro de San Anton, 3 miles to the north-east of the lighthouse appearing, when bearing to the north-westward, as two remarkable elevations known as the Tetas de Malaga, are all conspicuous marks. In thick weather the towers on Cantales point will be useful as landmarks. *See* view facing page.

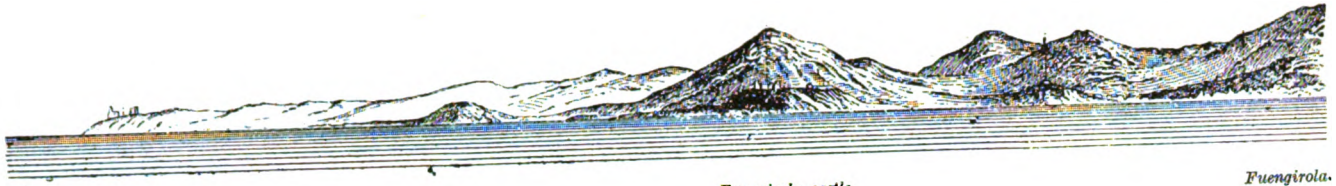
Plan 1848, Port Malaga.

PORT MALAGA (*Lat. 36° 43′ N., Long. 4° 25′ W.*) is formed by two moles or breakwaters; the inner portion of eastern mole (commenced in the sixteenth century) extends half a mile in a south-westerly direction from the foot of Monte de Gibralfaro, and has at its termination San Nicolas battery and a lighthouse; thence it extends southward for 394 yards, and curves to the south-westward for a further distance of 438 yards.

The western mole commencing on the east side of the outlet of the Rio Guadalmedina extends about 2 cables and with a short south-easterly bend, then for 2 cables in an easterly direction, a total distance of half a mile. Between the extremities of the two breakwaters there is a clear passage, 218 yards in width, with a depth of 8 fathoms.

Within the two breakwaters just described, transverse breakwaters extend from either side; the eastern one, commencing at 160 yards outside San Nicolas battery being 142 yards, and the western 558 yards, in length; leaving a passage between 120 yards in width. Large vessels

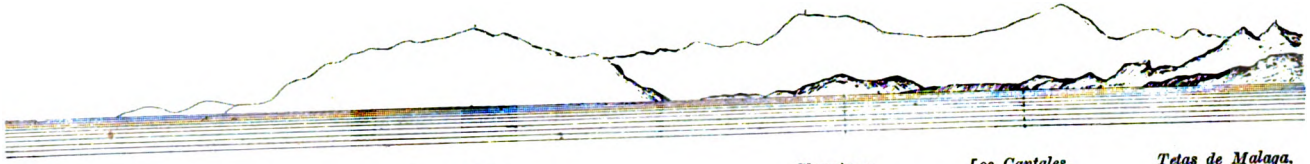
To face page 134.



Calaburras point lighthouse, bearing 234° true, distant 7 miles.

Fuengirola castle.

Fuengirola.

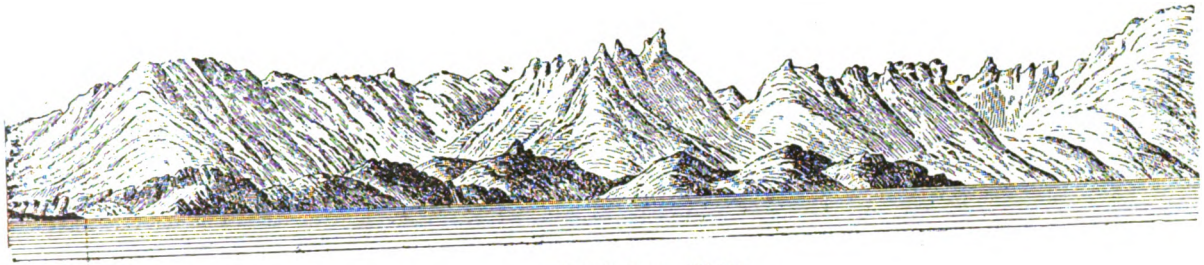


Sierra Mijas.

Churriana.

Los Cantales, bearing 277° true.

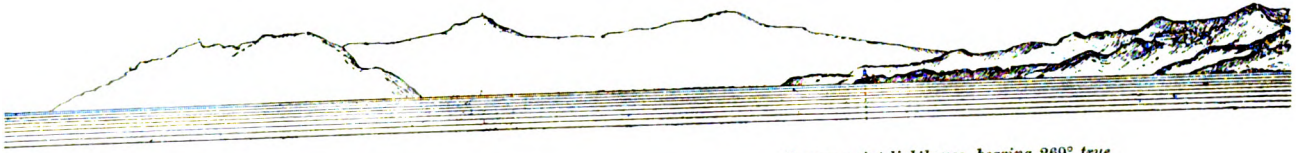
Tetas de Malaga.



Pico Zafaraya, 37° true.

Velez Malaga point, bearing 11° true, distant 8 miles.

San Nicolas battery lighthouse, Port Malaga.



Torrox point lighthouse, bearing 269° true,

No. 590.—Port Málaga—Alteration in character of Light.

Position.—Near San Nicolas battery.

Lat. 36° 42½′ N., long. 4° 24½′ W.

Details.—The character of the light has been altered from fixed white to *group flashing white* showing a group of *three* flashes followed by a *single* flash *every twenty seconds*, thus:—

Flash,	eclipse,	flash,	eclipse,	flash,	eclipse,
¼ sec.	2½ secs.	¼ sec.	2½ secs.	¼ sec.	7 secs.
	flash,	eclipse,			
	¼ sec.	7 secs.			

Remarks.—When within a distance of 7 miles from the light, a faint continuous light will be seen between the flashes.

Chart No. 1848. Med. 1, p. 135.

Plan 1848, Port Malaga. Var. 14° 10′ W.

can go alongside in any part, and generally have two anchors down and sterns secured to bollards, of which there are a number.

Depths. — The depths in the outer harbour are from 4¼ to 7 fathoms, the inner harbour has a depth of 28 feet throughout at low water, spring tides, and the depth at the entrance is from 4¼ to 4½ fathoms.

LIGHTS (*Lat. 36° 43′ N., Long. 4° 25′ W.*).—The white circular tower, with a red base, which stands near San Nicolas battery, about 900 yards from the outer extremity of the eastern mole, is 105 feet in height, and exhibits, at an elevation of 124 feet above high water, a *fixed white* light, which is visible in clear weather from a distance of 17 miles. *See* view, page 134.

At the extremity of the east mole a *fixed green* electric light is exhibited at an elevation of 42 feet above high water, and is visible in clear weather from a distance of 5 miles.

From the west mole, 33 yards within its head, a *fixed red* electric light is shown, at an elevation of 42 feet above high water, and is visible in clear weather from a distance of 7 miles.

A *fixed green* light is shown, at an elevation of 16 feet above high water, from the eastern inner molehead, and a *fixed red* light, at the same height, from the western inner molehead.

Tides. — It is high water, full and change, in Port Malaga, at IIh. 30m., and springs rise 3 feet. The tide is scarcely perceptible within the mole, and on the coast eastward. With strong winds from East to South there is a considerable rise in the port, the water being nearly up to the level of the mole, or about 6 feet above the usual level of the sea.

Tidal streams. — The tidal streams are said to extend out from 6 to 8 miles from this coast, joining the east-going current, the junction being generally visible.

Malaga roads.—Vessels of heavy draught anchor south-eastward of the molehead, in from 12 to 18 fathoms water, over sand and mud, the best berth being with San Nicolas lighthouse and the cathedral in line, bearing 328° true, *see* view on plan; here they are sheltered during north-westerly winds, but this anchorage should be left by a sailing vessel directly there is an indication of a change of wind to the opposite quarter, and no vessels are allowed to remain at anchor at the entrance to the harbour for a longer period than is absolutely necessary.

CAUTION. — With the exception of Almeria there is no available port of refuge, during south-easterly gales, along the whole coast of Spain from Malaga to Cartagena, and during the vintage season Port Malaga is often crowded with shipping.

General charts 2717, 1, 2158a, 449.

Plan 1848, Port Malaga. Var. 14° 16′ W.

A sailing vessel, seeking shelter in port in an easterly or south-easterly gale, might experience a difficulty in obtaining a secure berth, and would have to anchor at some risk, therefore it would be more prudent to keep the sea, and endeavour to reach Gibraltar bay, or the anchorage under Cape Spartel. When these gales prevail the coast becomes obscured, and can be seen only within a distance of 3 miles.

The city (*Lat. 36° 43′ N., Long. 4° 25′ W.*). — This important city, the Malaca of the Romans, and capital of the province, situated at the head of Malaga bay, is built along the coast at the foot of the mountains, gradually descending towards the sea. The chief buildings are the cathedral, bishop's palace, several churches, college of medicine and surgery, Custom-house, &c.; but the only edifice worthy of notice is the cathedral, a large building with a spire about 270 feet above high water. A British Consul and a Vice-Consul reside here. In 1910 the population was 133,993.

Passing through the western part of the town, the torrent of Guadalmedina, is crossed by two bridges; it is dry in summer.

The lofty mountains which flank the city, and the picturesque ruins of its ancient fortifications and castle, which cover the hill rising immediately to the eastward, render Malaga a conspicuous mark from seaward, at a distance of about 25 miles. The castle, standing on the summit of Monte de Gibralfaro, 550 feet high, which may be recognised by its large square tower, white embattled walls, and the steps or road, between the walls leading up to it, which appears like a large open staircase. The cathedral clock tower is a most conspicuous mark.

Climate.—The climate of Malaga is dry, the average annual rainfall being only 23·8 inches; almost the whole of the rain falls between the months of October to May. Owing to the high, but even, temperature, it is coming into favour as a health resort.

Communication. — Weekly steamship communication with Cadiz, Lisbon, and Vigo; also twice a week with Marseille, calling at Almeria, Cartagena, Alicante, Valencia, and Barcelona; and a steamship service with the coast ports and North African ports; there are also steamers to London, Liverpool, Glasgow, Dublin, and New York.

There is railway communication with every part of Spain, and a line to Lisbon. Tramways run through the principal streets.

Telegraphic communication with all parts. The telegraph office is always open. Telephonic communication with Madrid.

There is a coast road to Almeria.

Coal.—About 9,000 tons of coal are kept in stock in the open, by private firms, and coaling is alongside the quays or by lighters, of which there are a sufficient number; about 500 tons could be put on

Plan 1848, Port Malaga. Var. 14° 10′ W.

board in 24 hours at the quays, where there is a depth of 18 to 28 feet alongside, but if this quantity be required it is necessary to give two days' notice. The outer quays require lighterage, and the work is slower in consequence. Strong winds from East to S.W. outside; and from S.E. to S.S.W. inside, impede or prevent coaling. An unlimited supply of Spanish coal may be obtained.

Supplies.—Fresh meat, vegetables, and fruit are fairly plentiful and moderate in price; large supplies of bread are difficult to obtain. Good water may be obtained from a jet on the western mole, or from a water boat, but if supplied outside the harbour it is more expensive.

Repairs.—At Malaga are four important establishments for the construction of machinery.

Signal station.—Vessels are signalled, and communication may be established, by means of the International code, with a flagstaff near the lighthouse at the end of the Old mole.

Pilots are found off the entrance to the harbour; their boats may be distinguished by the letter P. on a white ground, on the stem. The employment of a pilot is compulsory for all vessels of deep draught.

Quarantine. — Malaga is a first-class sanitary station, and here vessels can have hull and cargo disinfected, and rats destroyed. *See* page 9.

The quarantine station is near the end of the Old mole.

Life-saving apparatus. — A lifeboat and rocket apparatus are maintained at Malaga.

Tugs.—Four steam tugs are available.

Trade. — Sugar cane and many tropical plants thrive well at Malaga. The principal articles of export are wines, spirits, and fruit, particularly rasins, almonds, grapes, figs, oranges, and lemons; also iron ore, lead, copper, olive oil, brandy, anchovies, barilla. The imports consist chiefly of coal, guano, and manures, salt fish, iron hoops, staves, bar iron; about 40,000 tons of coal are imported annually.

Shipping.—In 1910, 2,294 steam vessels, with a total tonnage of 1,749,796 tons, entered the port, and 369 sailing vessels, with a total tonnage of 16,456 tons.

Chart 773, Gibraltar to Adra.

Cantales point (*Lat. 36° 42′ N., Long. 4° 17′ W.*).—From the termination of the beach on the east side of Malaga mole the coast becomes elevated, with occasional cliffs and coves, and is fringed with rocks for 4 miles to Cantales point. This point derives its name from three watch-towers, known as Los Cantales de Malaga, standing on rocky points of moderate height and rather salient. The towers are conspicuous, and in thick weather indicate the position of Malaga to

Chart 773, Gibraltar to Adra. Var. 14° W.

vessels sighting them. (*See* view, page 134.) At a short distance from the coast there are from 14 to 18 fathoms water.

Velez Malaga point (*see* view, page 134). — From Cantales point the coast, eastward for 9 miles to Velez Malaga point, has a sandy beach, clear of danger, and affording anchorage with off-shore winds. Velez Malaga point has low land in its vicinity, and projects southward in a sandy spit, which is increasing, in consequence of the freshets of the Rio Ménoba, commonly known as the Rio de Velez Malaga; it has a considerable volume of water in winter, but scarcely any in summer.

The point should not be approached too closely, but at 1½ miles from it there are 18 and 20 fathoms water; and about 5 fathoms at half a mile.

LIGHT (*Lat. 36° 43′ N., Long. 4° 7′ W.*).—On the east side of entrance to the Rio de Velez Malaga, 66 yards from the sea, is a red conical tower, with a green lantern, 34 feet in height, which exhibits, at an elevation of 38 feet above high water, a *fixed white* light, which is visible in clear weather from a distance of 11 miles.

Aspect. — The mountains in the interior of Velez Malaga are exceedingly high, forming lofty summits and peaks, some of which are covered with snow the greater part of the year. They are a continuation of the lofty Ronda mountains, following the coast at a distance of some 20 miles from those of Antequera and Alhama, which unite with the still more elevated range of the Sierra Nevada.

The mountains, being visible from the African coast, afford excellent points of recognition. The most remarkable peak is named Zafarraya, of the Sierra Tejeda or Pelada, one of the most elevated mountain ranges in Spain, known by the sharp cone by which it is terminated; it is about 7,000 feet high, about 9½ miles inland, and distant 8 miles north-north-eastward from Velez Malaga town. *See* view, page 134.

Town.—The town of Velez Malaga stands on the slope of a small hill, 2 miles from the coast, and extends north and south: with the suburbs it had, in 1909, a population of 23,586.

The Rio Ménoba flows along the foot of the hill on the west, and Rio Seco on the east; the latter entering the sea near the Torre del Mar.

Supplies.—Small supplies of provisions may be obtained.

Anchorage.—The anchorage of Velez Malaga, named also Torre del Mar from a suburb of this name, with about 1,100 inhabitants, affords anchorage with winds from the north-west quarter. The bay extends northward to the Torre del Mar, and is the port of Velez Malaga. A berth will be found in 12 fathoms water, but the anchorage

Chart 773, Gibraltar to Adra. Var. 14° W.

should be left should there be any indication of a change of wind to the south-east. Fishing boats haul up on the beach.

Bad weather signals. — When the state of the sea makes it dangerous for vessels to remain off Torre del Mar the following signals will be shown from a flagstaff on the last pavilion of a building having two pavilions, and lying close to a chalet which faces the sea:—By day, two black balls; by night, two vertical lights, the upper being *white* and lower *red*.

Fishing boats are forbidden to remain or beach their boats when these signals are hoisted; they must take refuge in the Port of Malaga or under Torrox point.

Masters of vessels disobeying this regulation by trying to remain will incur a fine of 50 pesetas, and be responsible for any damage by shipwreck or accident to the vessel or crew.

Torrox point, rocky, and visible from some distance, lies 7½ miles eastward of Velez Malaga point; on it are the ruins of Torrox castle. The intermediate coast, low and sandy, is clear of danger, and vessels may obtain anchorage with off-shore winds. The town of Torrox, having a population of 6,410, and situated 2 miles inland, is visible from seaward in the form of an amphitheatre.

LIGHT.—On Torrox point, on the site of the ruins of the castle, is a yellow conical tower, 77 feet in height, which exhibits, at an elevation of 93 feet above high water, a *fixed white* light, which is visible in clear weather from a distance of 15 miles. *See* view, page 134.

Plan of Nerja anchorage on 2717.

Nerja. — From Torrox point the coast eastward is rugged for 4 miles to the town of Nerja, with a population of 6,786, which is situated near the coast, and in the middle of a plain surrounded by hills, scattered with vineyards and houses, with the ruins of a castle at its southern end, 1½ miles eastward of which is the point of a ravine, high and rugged, the coast between forming a bay, with sandy beaches and rocky points.

Anchorage. — Small vessels may anchor south-eastward of the castle in 8 or 9 fathoms water, over a sandy bottom, but sheltered only with off-shore winds, and they should leave when there is any indication of wind from the south-eastward.

Plan of Herradura bay on 2717.

Herradura bay (*Lat. 36° 44′ N., Long. 3° 45′ W.*). — Cerro Redondo point, is situated 6 miles from Nerja, and Mona point is 1¼ miles farther to the south-eastward; there are towers on both these points. Herradura bay, semicircular, and about three-quarters of a

Plan of Herradura bay on 2717. Var. 14° W.

mile deep, is contained between the points, and surrounded by high and rugged land; at its head is a beach, where the Rio Jate runs into the sea. The ruins of Herradura (horseshoe) castle may be seen on the coast, a little eastward of the river. *See* view, page 142.

Supplies in small quantities and water may be obtained.

Anchorage.—The best anchorage in this bay is near the western shore in 12 or 15 fathoms water, over mud bottom, but it can only be used as a temporary anchorage in the summer, being open to the southward.

Plan of Berengueles bay on 2717.

Berengueles bay, on the east side of Mona point, is between 3 and 4 cables deep, and in fine weather, with off-shore and westerly winds, affords anchorage for small vessels in from 14 to 16 fathoms water, about 2 cables eastward of Caballas island, which is close to the coast. Coasters anchor off the beach in depths of 6 or 7 fathoms, over sand, at less than a cable north-eastward of the islet. The coast of this bay is high land, with some beaches; there is no town.

Chart 773, Gibraltar to Adra.

Almuñecar (*Lat. 36° 44′ N., Long. 3° 41′ W.*), nearly 2 miles eastward of Mona point, is a town containing a population of about 9,000, and standing on a hill which terminates in San Cristobal point, on either side of which is a sandy bay, where small vessels may anchor in fine weather, with off-shore winds. Sugar, wine, spirits, and raisins are exported.

Coal and supplies.—Coal can be obtained from Motril; fresh provisions and water in small quantities can be procured.

Belilla bay.—At a mile eastward of San Cristobal point, and at the termination of a beach, is Belilla point and tower; the point is rocky and between it and Jesus point, about a mile farther eastward, is Belilla bay, surrounded by high land, with some patches of beach. A tower stands on a point in the middle of the bay, and eastward of it a small stream runs into the sea.

Anchorage. — Temporary anchorage may be obtained to the south-east of the tower in 10 or 12 fathoms water, over sand and mud; but farther out the bottom in places is rocky. Coasting vessels anchor nearer the shore.

As south-easterly and easterly winds blow fresh and often last for some time, vessels should leave the instant there is any sign of a levanter, which will be indicated by the horizon being obscured by thick whitish clouds, as before remarked.

General charts 773, 2717, 1, 2158a, 449.

Plan of Salobreña anchorage on 2717. Var. 13° 50′ W.

Salobreña (*Lat. 36° 44′ N., Long. 3° 35′ W.*).—From the east point of Belilla bay the coast eastward is of moderate height, as far as the Playa de Salobreña, and the town of that name (the Salambina of the ancients). At a short distance from it, on a rocky hill sloping to the south-eastward are vestiges of the former limits of this town, and the ruins of the strong and spacious castle west of it. A large sugar factory with a tall chimney situated near the beach is visible from a considerable distance. The population is about 5,000.

Anchorage.—The anchorage off the Playa de Salobreña is somewhat sheltered, from easterly winds, by the point of the Rio Motril. The usual anchorage is north-westward of an isolated hummock on the beach known as the Peñon de Salobreña, in about 9 fathoms water, over muddy bottom; or farther out, according to circumstances and the size of the vessel.

Coal and supplies.—Coal can be obtained from Motril.

Fresh meat and vegetables may be procured by giving notice, and water procured from an excellent spring on the north side, at the foot of the Peñon, and near the sea.

Chart 773, Gibraltar to Adra.

Playa de Motril.—The Playa de Motril, which extends eastward 9 miles to Cape Sacratif, has for some time been steadily advancing southward, caused by the freshets of the Rio Guadalfeo; the Peñon de Salobreña, which was formerly an islet, is now surrounded by sand and connected to the shore by a small peninsula.

Port Motril.—Harbour works.—An eastern breakwater and western mole are under construction.

Lights.—A *fixed white* light marks the end of the eastern breakwater, and a *fixed red* light the end of the western mole; they are about 15 feet above high water, visible from a distance of about 4 and 1½ miles, respectively, and are moved seaward as the works progress.

Anchorage.—Barradero castle stands a cable from the shore, and coasting vessels trading to Motril load and discharge on the beach. Vessels with off-shore winds anchor in 10 or 11 fathoms water, southward of the castle; but there is a considerable sea with other winds, particularly those from south-westward, which are the most frequent. The bottom is fine sand, and there are 6½ fathoms water at 2 cables from the beach; but farther out, the bottom is muddy.

Town.—The town of Motril is on a rise in the middle of the plain, 1½ miles northward of the castle. It has a population of 17,016, is the great sugar-making district of Spain, and is lighted by electricity. The Barradero de Motril, near the shore, is chiefly inhabited by fisher-

Chart 773, Gibraltar to Adra. Var. 13° 40′ W.

men and Carabineros and is connected with Motril by a tramway; westward of Barradero there are storehouses, and eastward a sugar factory with a black chimney, which may be seen from a distance of 7 or 8 miles.

Coal and supplies.—About 2,000 tons of coal are kept in stock and 200 tons can be put on board in a day; there is no night work; there are two lighters, each holding 44 tons, and 15 barges, available.

Supplies of fresh provisions can be procured, and water obtained from the wells at the castle.

Trade.—The exports are calcined calamine and esparto, and imports coal, wood, planks, and artificial manures. About 28,500 tons of coal are imported annually.

Cape Sacratif, known also as Carchuna point, is steep, rocky, and rugged, with the ruins of a tower on its extremity. It is the highest land in this vicinity, forms the western slope and termination of the Sierra de Jolucar, which rises 2,765 feet above the sea, and is conspicuous to vessels standing along the coast. (*See* view facing page.) The current off the cape generally sets strong to the eastward, and it is difficult to get past it with westerly winds.

The whole coast, from Malaga to Cape Sacratif, is clear of danger, and may be approached to a prudent distance; Velez Malaga point should not, however, be passed too close. At 5 miles from the shore there are from 35 to 50 fathoms water. The coast is moderately high, with a sandy beach predominating, but the land in the interior rises to a great elevation.

About one mile westward of Cape Sacratif is the small town of Torre Nueva, close to the coast, with a population of about 1,000.

LIGHT (*Lat. 36° 42′ N., Long. 3° 28′ W.*).—On the hill, about 30 yards from the extremity of Cape Sacratif, a red conical brick tower, 56 feet in height, exhibits, at an elevation of 320 above high water, a *fixed* and *flashing white* light every minute. The *fixed* light is visible from a distance of 16 miles in clear weather, and the *flash* 24 miles. (*See* view facing page.) The action of this light has on several occasions been reported as irregular.

Cala del Chucho, on the east side of Cape Sacratif, is a small cove in which coasters find a little shelter from westerly winds. Thence the beach of Carchuna extends as far as Cala Honda, and between (at 1½ miles from the cape and half a cable from the shore) is Carchuna castle, 1¼ miles eastward of which is Llano de Carchuna point. There are some rocks close to the shore between the cape and point.

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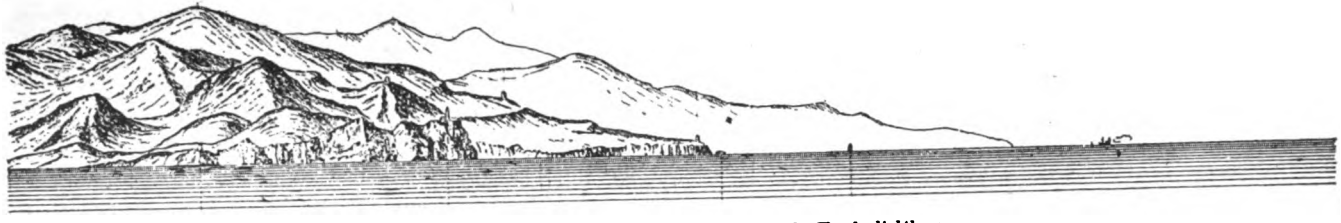
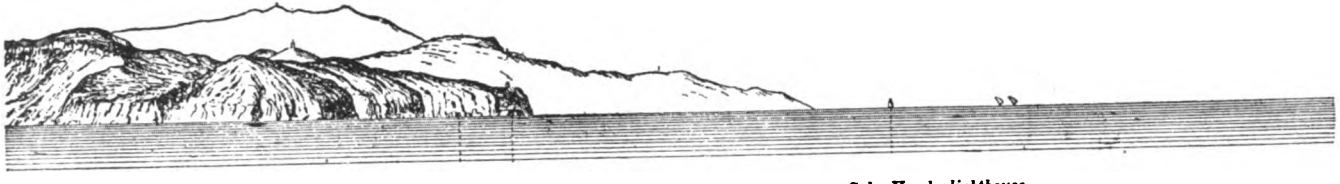
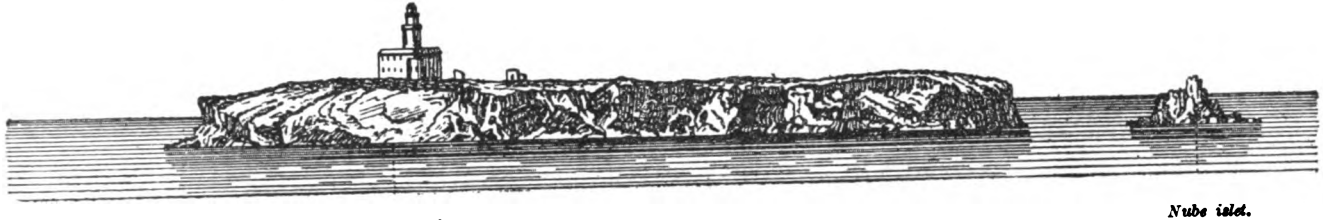
Torre del Pino. *Torre de la Mona.* *Herradura bay.* *Cape Sacratif.*



Sierra de Jolucar. *Cape Sacratif lighthouse, bearing 70° true, distant 5 miles.* *Castle.* *Cala Honda lighthouse.*



Melonar tower. *Carchuna castle in line with Zambullon tower.* *Cala Honda lighthouse.*



Landing place. *Nube islet.*

Alboran island from the anchorage.

Plan of Cala Honda on 2717.

Cala Honda, a small cove used by vessels carrying on trade with Motril, and considered the port of that town, is formed by a semi-circular beach between Llano de Carchuna point on the west, and a steep hill, 367 feet above the sea, projecting 1½ cables southward, with Zambullon tower on its extremity. (*See* views, page 142.) At the foot of the hill and within the cove is an islet separated by a narrow rocky channel.

LIGHT (*Lat. 36° 42′ N., Long. 3° 25′ W.*).—On Llano de Carchuna point, 60 yards from the sea, is a white conical tower, 34 feet in height, which exhibits, at an elevation of 44 feet above high water, a *fixed red* light, which is visible in clear weather from a distance of 8 miles.

Anchorage.—The bend of the shore is a little more than a cable deep, but steep-to, the general depths being from 9 to 23 fathoms, over coarse, sandy bottom. Coasting vessels of about 100 tons burden moor here, with their sterns to the shore, but require to be well secured, as heavy squalls come down from the mountains.

Town. — The town of Cala Honda, with a population of about 1,200, stands a short distance from the beach, on the slope of the mountains; it offers but few resources.

Water may be obtained from a spring, a quarter of a mile north-west of the town; but if a large quantity is required, Cala Arreyana 1½ miles eastward, should be resorted to.

Chart 773, Gibraltar to Adra.

Coast.—From Cala Honda the coast, trending eastward, is moderately high and rugged as far as Melonar point, distant about 3 miles from Llano de Carchuna point. Nearly midway is Cala Arreyana, small and frequented by coasters for water, which may be obtained in abundance.

Melonar point, high and steep, and surmounted by a tower, (*see* view, page 142), is the eastern termination of the Sierra de Jolucar; the western being Cape Sacratif. The land rises rapidly in ridges and ravines, in one of which, formed like an amphitheatre, is the town of Gualchos, with a population of 4,009, situated 1,063 feet above the sea, and north-eastward 3 miles from Cala Honda, and shows out conspicuously in contrast to the dark land near it.

Plan of Ferro castle anchorage on 2717.

Ferro castle stands upon a steep isolated hill of small extent, situated three-quarters of a mile north-eastward from Melonar point, and has a sandy beach on each side of it; Torre Cambriles stands between the beaches. The town of Ferro castle, with 1,350 inhabi-

Plan of Ferro castle anchorage on 2717. Var. 13° 30′ W.

tants, is about 1½ cables from the coast on the eastern side at the foot of the hill.

Water can be obtained from the wells of the town, and also on the beach, west of the castle.

Trade. — The principal exports are iron ore, fruits, sugar, lead, and galena, and imports coal and coke.

Anchorage, sheltered from north-west, may be obtained in from 9 to 16 fathoms water, over mud, off Torre Cambriles. Squalls blow heavily down the ravines, and owing to the steepness of the ground vessels are liable to drag their anchors; they must be prepared to weigh at the first indication of a change, which is often that of the sea rising before the wind. This anchorage is also the port of Gualchos.

Chart 773, Gibraltar to Adra.

Coast.—From the beach east of Torre Cambriles, the coast becomes high, and has neither cove nor anchorage, 6½ miles eastward, as far as Negra point, which is so named from the colour of the land. A tower stands on Negra point, and about midway between it and Ferro castle there are two others on the cliffs of the coast. The coast is all along clear of danger, the rocks being close to the shore.

Rábita.—At 2 miles beyond Negra point is the castle and town of Rábita; the latter containing a population of about 1,200, is situated on a small plain, at the foot of a hill upon which the castle stands. It has a short beach, where small craft haul up.

ADRA. — From Rábita beach the coast eastward is high, steep, without beach or anchorage, and clear of danger. Guarca tower stands on a height 5 miles eastward of Rábita, and the town of Adra is 3 miles beyond it in the same direction; at 2 miles east of the tower is the boundary between the provinces of Granada and Almeria.

LIGHT (*Lat. 36° 45′ N., Long. 3° 2′ W.*). — A *fixed white* light is exhibited, at an elevation of 123 feet above high water, from a grey conical tower, 42 feet high, situated on a hill about half a mile westward of the town, and visible in clear weather from a distance of 11 miles. For arc of visibility, *see* Light list.

Plan of Adra anchorage on 2717.

Anchorage. — The anchorage, off any part of the beach, is of small extent, and exposed to southerly winds. A good berth is in 7 or 8 fathoms water, over mud, with the ruined castle bearing about 7° true, distant 4 cables: but with any indications of south-westerly or westerly winds, a vessel should leave for Roquetas, on the east side of the plains of Almeria. The Rio de Adra enters the sea nearly three-

General charts 2717, 1, 2158a, 449.

Plan of Adra anchorage on 2717. Var. 13° 30′ W.

quarters of a mile south-east of the town; the freshes have formed a projecting point, which affords some shelter from easterly winds.

Harbour works.—A breakwater is being constructed westward of the town. In 1913 about 150 yards had been completed.

Town. — The town of Adra (ancient Abdera), with a population of about 10,000, built on a hill near the beach, has numerous lead mines in its vicinity, and several smelting works are erected between this town and Rábita. There are also several sugar factories.

Coal and supplies.—About 300 tons of coal are kept in stock, and there are 10 lighters, each holding 8 tons. About 300 tons can be loaded in 24 hours.

Meat is plentiful, but vegetables are scarce; good drinking water may be obtained from a tank vessel on application to the Harbour master.

Trade.—The exports are lead, grapes, and almonds, and imports, coal, coke, machinery, and manure. In 1910, 20 vessels entered the port, with a total tonnage of 17,378 tons.

Chart 774, Adra to Cartagena.

To the eastward of the mouth of the Rio de Adra, the coast forms a bay a mile deep, low, and sandy, with several rocks near it, at the head of which is the tower of Aljamilla. Two small lagoons, named the Albuferas, are situated close to the coast, between the river and tower.

Tunny fishery. — Fishing nets for tunny are laid out during the season, 1st February to 30th October, about 2 miles east-south-eastward of Punta del Rio, and extend about a mile from the shore, in a depth of 16 fathoms. *See* page 73, for Lights, marks, and caution.

Llanos de Almeria. — Extensive low land, stretching about 5 miles northward beyond the general line of coast, commences at Aljamilla tower, and extending eastward, terminates near Bajos tower, in the Bay of Almeria, and is known as the Llanos de Almeria.

The plains being often blended with the horizon, the high land by which they are bounded, on the north, is misleading if estimating a distance from the coast, but a bearing of the light at Sabinal point, the south-east extreme, and in thick weather the use of the lead will keep a vessel clear. There are extensive fisheries along this coast.

Coast.—From Aljamilla tower (*Lat. 36° 45′ N., Long. 2° 56′ W.*) the coast trends south-eastward for 2½ miles, to the round tower of Balerma, where there is a foundry and a coastguard station by the seashore. The town of Dalias (7,136 inhabitants), on the mountains about 6 miles northward of Balerma tower, is conspicuous from the offing. About 3 miles south-eastward of Balerma tower is Moro point, the south-west extreme of the plains of Almeria, low, rocky, and foul,

General charts 2717, 1, 2158a, 449.

Chart 774, Adra to Cartagena. Var. 13° 20′ W.

and near it is **Guardia Vieja castle,** standing on a small elevation over a steep cliff.

Between Aljamilla tower and Moro point the coast is low, sandy, and clear of danger, affording shelter against easterly and south-easterly winds; but as south-westerly winds blow directly on shore, sailing vessels should avoid this anchorage in winter. The best berth for shelter from south-easterly winds, is in 6½ fathoms water, over a sandy bottom, about a third of a mile south-west of Balerma tower, near which there is a small fishing village.

Water may be obtained from wells at, and near, the tower.

Baños point.—From Moro point the coast again trends south-eastward, and is low and rocky for two-thirds of a mile to Baños point, so named from some sulphur baths between it and the castle; thence the coast is low and sandy, for 3½ miles, as far as Entinas point, the shore between the points forming a bend about half a mile deep, is skirted with rocks, and during strong winds and a heavy sea, breakers extend some distance off; a good berth should be given to this part of the coast.

Culo de Perros, a rocky shoal, with 13 feet water over it, extends 9¾ cables southward from Baños point; Sabinal point lighthouse, open south of Entinas point tower, bearing 88° true, leads south of the shoal.

A ledge of rocks extends half a mile southward from Entinas point, with 7 fathoms water on its extremity.

Tunny fishery.—Fishing nets for tunny are laid out during the season 1st February to 30th October, for a distance of about 1½ miles, southward of Entinas point. *See* pages 73, 74, for Lights, marks, and caution.

Sabinal point, the south-east extreme of the plains of Almeria, is 3½ miles eastward of Entinas point; the coast between, being low and sandy, should not be approached too closely.

LIGHT (*Lat. 36° 41′ N., Long. 2° 42′ W.*).—On Sabinal point, at 40 yards from the sea, a yellow conical tower, 95 feet in height, exhibits, at an elevation of 105 feet above high water, a *fixed* and *flashing white* light *every two minutes*, which is visible in clear weather from a distance of 16 miles. As, however, the lighthouse has been damaged, it must be considered unreliable.

Shoal.—A sandbank, with a depth of 3 fathoms, on which the ss. *Armenia* struck in 1910, is reported to be situated about three-quarters of a mile south-south-westward of this point. Vessels should not approach the coast in this vicinity within a distance of 2 miles.

General charts 2717, 1, 2158a, 449.

Chart 774, Adra to Cartagena. Var. 13° 10′ W.

Roquetas. — Between Sabinal point and Elena point, 3 miles north-eastward, the coast is low and sandy. Roquetas castle stands a short distance from the beach nearly 4 miles north-eastward of Elena point, and half a mile southward of the town of the same name, which has, including the district, 1,959 inhabitants.

LIGHT. — On the beach south of the town of Roquetas, a *fixed white* light is exhibited from a yellow conical tower, 31 feet in height, at an elevation of 57 feet above high water, and is visible in clear weather from a distance of 10 miles.

Water and provisions must be obtained from Almeria.

Anchorage.—Between Elena point and Bajos tower, 6 miles to the north-eastward, safe and convenient anchorage may be found for all classes of vessels during winds between S.W., through west, to N.W. A vessel may anchor anywhere after passing the parallel of the castle, but a good berth for a large vessel is a mile from the shore, in 16 fathoms water, over coarse sandy bottom, with Roquetas castle bearing about 245° true. Small vessels and coasters anchor in 6 or 8 fathoms. There is a rocky patch, with 9 fathoms water on it, about 6 cables 65° true from the castle.

Roquetas anchorage being extensive and well sheltered from the westward is much frequented, but it is exposed to south-easterly and easterly winds, therefore can only be considered as a temporary anchorage, and should be left on any indications of easterly winds, which are the most prevalent. These winds generally come from N.E. and E.N.E., but at times from S.E.

Plan of Alboran island on 2717.

ALBORAN ISLAND, small, and belonging to Spain, bears 155° true, and is distant 50 miles from Sacratif lighthouse; and 356° true distant 29 miles from Cabo Tres Forcas in Marocco.

The island is 66 feet above the level of the sea, a third of a mile in length east and west, and a sixth of a mile in breadth, the cliffs on the south side being steep, but they are less so on the north. It is of a reddish colour, and with any sea is surrounded by breakers; in clear weather it may be seen from distances of 10 or 12 miles.

LIGHT (*Lat. 35° 56′ N., Long. 3° 2′ W.*). — On the summit (near the south-west end) of the island is the lighthouse, 62 feet in height, exhibiting, at an elevation of 115 feet above high water, a *fixed white* light, which in clear weather is visible from a distance of 16 miles. The lighthouse is a conical grey tower, and rises from the centre of the keeper's dwelling, a square two-storied building, painted light green,

General charts 2717, 1, 2158a, 449.

Plan of Alboran island on 2717. Var. 13° 10′ W.

having two redoubts, one at the north-west angle, and the other at the south-east angle. *See* view, page 142.

Rocks. — The island is skirted by sunken rocks. A rock, with 4 fathoms water on it, lies at a distance of nearly 2 cables off its south-east side; and off the greater part of the island the ground may be considered to be foul within the distance of a cable. Nube islet lies half a cable from the east end of Alboran.

Life-saving apparatus. — A rocket apparatus is kept at Alboran.

Anchorage.—Temporary anchorage will be found on the south-east side of the island in 12 fathoms water, about 3 cables off-shore, sheltered from westerly and north-westerly winds.

The island is frequented by smuggling vessels, which find shelter from the easterly or westerly winds, commonly prevailing in the middle of the channel.

Landing.—There are coves both upon the south-east and north-west sides, where landing might be effected with off-shore winds.

Submarine telegraph cable.—The telegraph cable between Almeria and Melilla is landed on the small beach at the south-eastern extreme of Alboran island; there are no buoys to mark the direction on account of the heavy seas experienced there.

Vessels using the temporary anchorage must be careful to avoid the cables.

CAUTION. — As strong south-easterly currents are experienced in the vicinity of the island, caution should be observed when approaching it at night.

Chart 774, Adra to Cartagena.

ALMERIA BAY (*Lat. 36° 50′ N., Long. 2° 28′ W.*), between Elena point, on the west, and Cape de Gata, on the east, is 22 miles wide and 8 miles deep, with depths of from 18 to 28 fathoms, at 2 miles from the shore. The coast is high and cliffy west of the town, but low and flat elsewhere, sheltered from the east and west, and is clear of danger.

The best distant mark for Almeria is the Sierra Gador, a branch of the Sierra Nevada, which extends east-north-east and west-south-west, about 11 miles north-west of the bay, and attains an elevation of 7,621 feet above the sea.

The Sierra Nevada backs the coast westward at the distance of some 30 miles, and interlinks with other mountains, which terminate in the Sierras de Algeciras, producing the most remarkable and the

Chart 774, Adra to Cartagena. Var. 13° 20′ W.

highest peaks in Spain; they are covered with perpetual snow, and visible in clear weather from the coast of Africa.

The most remarkable summits of the Sierra Nevada are the Cerro Mulahacen, 11,660 feet high, and the Pico Veleta, 3 miles westward, 11,380 feet high. These two conspicuous objects, which in clear weather are always seen in the offing between Velez-Malaga and Almeria, serve as marks for Adra, Almeria, &c. The Cerro Mulahacen rises about 20 miles inland.

The position of Almeria is recognised by the old fort of Alcazaba, situated 240 feet above the sea, upon table land with steep sides, a short distance north-west of the town. On nearing, the belfries of the several churches will be seen, and soon after the whole town.

Plan of Almeria road on 1588.

Almeria road lies between Torrejon point, to the westward, and the mouth of the river, about 3 miles eastward.

Depths. — There are depths of 7 to 20 fathoms in the roads, and 3 to 6½ fathoms in the harbour.

Anchorage. — Vessels remaining only a short time, may anchor outside the breakwater in 12 to 14 fathoms water, over sandy bottom, with good holding ground, the bottom is regular, from 11 to 12 fathoms at half a mile from the shore and 18 to 28 fathoms at a mile. Gales from S.S.W. to S.E., which rarely occur on this part of the coast, seldom reach the anchorage; but should the wind blow home, it will be of short duration, having been expended in the offing. However hard it may blow it moderates at night, leaving only a troublesome sea.

Harbour (*Lat. 36° 50′ N., Long. 2° 28′ W.*). — The West breakwater, commencing from the beach 2 cables westward of Rambla point, extends seaward in a south-easterly direction a distance of 2,100 yards. The depths alongside the breakwater vary from 25 to 40 feet, and vessels can thus discharge and load alongside it. The railway runs down the West breakwater for a distance of about 600 yards.

The eastern mole extends for a distance of 450 yards, south-westward, from the shore close to the suburb of Las Almadravillas, leaving an entrance between the moles, about 350 yards in width. The harbour thus formed has a depth of 4 to 6½ fathoms over nearly the whole of its area, and vessels are allowed to load and discharge alongside the East mole. The port is said to be subject to silt.

Pier. — A pier, 120 yards in length, for loading ore for a private company, and connected with the railway, lies about three-quarters of a cable eastward of the east mole. It is about 50 feet above high water, very conspicuous, and has a depth of 5 fathoms off its outer end, and 4½ fathoms for about 300 feet inwards.

General charts 2717, 1, 2158a, 449.

Plan of Almeria road on 1588. Var. 13° 20′ W.

Pilots.—The following is the rate of pilotage:—

PILOTAGE.

From—			Pesetas.
50·01	to 100	tons	10
100·01	500	„	20
500·01	1,000	„	30
1,000·01	1,500	„	40
1,500·01	2,000	„	50
2,000·01	2,500	„	55
2,500·01 tons and upwards, for every 500 tons additional			5

The above rates are charged for both inward and outward pilotage.

MOORING.

From—			Pesetas.
50·01	to 100	tons	5
100·01	500	„	10
500·01	1,000	„	12
1,000·01	2,000	„	15
2,000·01 tons and upwards, for every 500 tons ...			5

LIGHTS (*Lat. 36° 50′ N., Long. 2° 28′ W.*).—From a yellow iron support, 46 feet high, situated near the end of the West breakwater, a *fixed red* light is exhibited at an elevation of 56 feet, and is visible in clear weather from a distance of 9 miles. The support of the light has at its base a small hut for its protection during the day time.

A *fixed green* light is shown, at an elevation of 27 feet above high water, from the end of the East mole; it is visible, in clear weather, from a distance of 5 miles.

A *fixed white* light is exhibited, at an elevation of 66 feet from the end of the pier about one cable eastward of the inner breakwater, and is visible from a distance of 3 miles.

Buoys.—There are many mooring buoys inside the harbour.

Life-saving apparatus.—A rocket apparatus and lifeboat are maintained at Almeria.

Town.—The town of Almeria (the Murgis of the Romans, and the Al-Meria of the Arabs), the capital of the province of this name, stands on the slope of the Sierra de Énix near the beach at the head of the bay; by the last census (1906-1907) it had a population of 47,326. A British Vice-Consul is resident.

Communication.—Steamship communication weekly with Malaga, three times a month with Oran, twice a week with Cartagena, and weekly with Melilla. There is a railway to Madrid, and a line to

General charts 2717, 1, 2158a, 449.

Plan of Almeria road on 1588. Var. 13° 20′ W.

Granada; communication by cable with Melilla and Alhucemas. The telegraph office is always open.

Coal and supplies. — About 2,600 tons of coal are kept in stock, and from 500 to 600 tons can be put on board in 24 hours, the lighters holding from 10 to 20 tons each; there is a coal wharf, 1,400 feet in length, with 16 to 25 feet water alongside. Strong westerly winds may prevent or impede coaling.

Supplies of fresh provisions may be obtained in abundance and water from a tank vessel, but it is poor for drinking.

Trade. — The town has manufactures of soda and saltpetre, and of cordage and other articles made of the esparto rush; and the trade in lead, sulphur, iron ore, grapes, and barley affords considerable employment, besides which there are smelting works for lead. There are several silver mines in the province.

In 1910 the exports, consisting chiefly of iron and lead ores, fruits, esparto grass, &c., were valued at £1,107,978, and the imports of coals and coke, timber, staves, wagons, iron, and steel at £172,471. About 53,000 tons of coal and patent fuel are imported annually, most of which is imported by the various works for their own consumption.

Shipping. — In 1910 the total number of steam vessels that entered the port was 1,172, of a total tonnage of 1,366,279; and sailing vessels 264, of a total tonnage of 18,613 tons.

Rio de Almeria. — The Rio Andarax, generally known as the Rio de Almeria, rises in the southern slope of the Sierra Nevada, flows into the sea about 2 miles eastward of the town, and forms by its annual freshets the Punta del Rio, a flat sandy point which shelters the roadstead from easterly winds. The point should not be approached closely, as it is liable to extend seaward after the freshets. The river is always dry in summer, and usually an inconsiderable stream in winter, except after heavy rains.

There is an irrigation canal about 2 cables westward of the river, the entrance to which is marked by a pillar 10 feet in height.

Chart 774, Adra to Cartagena.

Coast. — Between Punta del Rio and San Miguel tower (*Lat. 36° 46′ N., Long. 2° 15′ W.*), 9 miles south-eastward, a bay is formed about 2 miles deep; on its coast are the towers of De Bobar, La Canada, Perdigal, and Garcia.

Anchorage will be found off a clean, sandy beach anywhere between San Miguel tower and Cape de Gata, 4½ miles to the south-eastward. This beach, named Corraletes, is clear of danger, and the anchorage off it is much resorted to by vessels during easterly winds.

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Chart 774, Adra to Cartagena. Var. 13° W.

It is necessary, however, they should leave the moment there is a sign of a westerly or S.W. wind.

Tunny fishery.—A tunny fishery is established for the season, 1st February to 30th October, at about 1½ miles south-eastward of Garcia tower. *See* page 73, for Lights, marks, and caution.

Winds.—The prevailing winds are from S.W. and westerly, sometimes strong, but lose their force at the head of the bay, and are succeeded by calms and land winds. S.E. and southerly winds seldom blow in the bay, and those from East or N.E., which at times blow strong, are only felt on the western shore. In fine settled weather, land and sea breezes prevail.

The sea breeze commences between 9h. and 10h. a.m., draws to the S.E. and S.S.E. if the wind be East or N.E. in the offing, or to the S.S.W., if it be from the westward in the offing. It attains its greatest strength between noon and 2h. p.m., then gradually falls, and in the evening becomes calm, and is succeeded by the land wind at night.

During winter, and when north-easterly winds prevail, they blow strong on both shores, and at times vessels are obliged to shorten sail in crossing the bay. The severest gales are those from the south-west quarter.

Plan of Cape de Gata on 2717.

CAPE de GATA, the eastern point of Almeria bay, is a rugged headland, and descends in declivities from the Sierra de Gata, which commences at Teste, or La Testa point, and terminates at 3 miles eastward of Carboneras. On the summit of the cape is the tower of the same name, known also as La Teste, and three-quarters of a mile southward of it is the castle of San Francisco de Paula or Corraletes, situated on the summit of a steep hill about 50 yards from the sea, with an island and some rocks at its foot. *See* view, page 156.

LIGHT (*Lat. 36° 43′ N., Long. 2° 11′ W.*).—On San Francisco castle, a white tower, 60 feet in height, exhibits, at an elevation of 167 feet above high water, a *fixed* and *flashing white* light *every thirty seconds*, which in clear weather is visible, the *fixed* from a distance of 16 miles and the *flashing* 19 miles. For arc of visibility, *see* Light list and chart.

Rock.—A rock, with 6 feet water over it, and steep-to, bears 155° true, distant 6½ cables from Cape de Gata lighthouse, and about 5 cables from the nearest land; it has a flat surface, is 260 feet long, and 50 feet wide, and was formerly known as Cape de Gata rock. There are 7 and 8 fathoms water between it and the shore, 9 fathoms close to its east side, and 5 fathoms on its west side.

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Plan of Cape de Gata on 2717. Var. 13° W.

Vessels should not attempt to pass between the rock and the shore, but give the cape a fair berth in passing. When the sea is smooth, the white appearance of the water on the rock renders it distinctly visible.

Anchorage. — Between Torre de la Teste and the cape is Corraletes bay, 3 cables in length, off which coasting vessels anchor during easterly winds in 13 fathoms water, over a bottom of sand and weed, with the lighthouse bearing 79° true, at about 7 cables from the shore, exposed to all winds from S.E., round south, to West.

Tunny fishery. — Tunny nets are laid out, during the season, 1st February to 30th October, in Corraletes bay. *See* page 73, for Lights, marks, and caution.

Chart 774, Adra to Cartagena.

Landmarks. — About 1½ miles eastward of the lighthouse there is a remarkable white patch in the land near the sea, seen from a considerable distance, and two high pyramidal rocky masses, named Los Frailes (the Friars) (*Lat. 36° 47′ N., Long. 2° 4′ W.*), rising to 1,700 feet above the sea, over Loma Pelada point, about 7 miles eastward of Cape de Gata, also indicate the position of the cape. These are often the first peaks seen at a distance, especially by vessels approaching from the eastward.

Directions.—The sudden meeting of opposite winds is very common, occurring often with a clear sky (*see* page 41). A sailing vessel bound westward against westerly winds should be near the coast at night, in order to have the advantage of the land wind; and a moderate distance from it in the morning, so as to profit by the sea breeze, which in settled weather commences from the southward; thus avoiding the general easterly current.

Currents. — Generally there is a strong current in the bay, but its direction depends on that of the wind. Strong currents are experienced off the cape, also over the rock off Cape de Gata, generally setting East or E.N.E., and increasing in strength with westerly winds.

Plan of Port Genovés and San José bay on 2717.

Port Genovés, a small semicircular cove, open eastward, with a clean but rather shallow sandy beach, is 3 cables deep, affording shelter to small vessels. Its entrance, about 4 miles eastward of Cape de Gata, is about half a mile wide, and the depths are 3¼ to 6 fathoms, the bottom being sand and ooze.

On the south side of the cove is the Morro Genovés, a projecting promontory, 280 feet above the sea, nearly isolated, and of conical form and somewhat flattened at its summit, its base, rather less than 400 yards in diameter, is nearly surrounded by the sea.

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Plan of Port Genovés and San José bay on 2717. Var. 13° W.

Anchorage. — The best berth, sheltered from off-shore winds, is northward of the Morro Genovés. Outside the cove there is also sheltered anchorage, in 6 or 7 fathoms water, but not with winds southward of S.W. With fresh westerly winds, squalls and strong eddies rush down from the high land, which render the anchorage indifferent.

San José bay (*Lat. 36° 45′ N., Long. 2° 6′ W.*). — San José castle is situated on the promontory, which separates Port Genovés and San José bay, and 1⅓ miles, north-eastward of it, is Cala Figuera tower, standing over the cliff which forms the north-east boundary of San José bay; the beach, more than half a mile in extent, is named Playa de los Muertos, off which is the anchorage.

There is a village in the bay, and a castle about a quarter of a mile northward of San José castle.

Anchorage. — The bay affords much the same shelter as Port Genovés; the best anchorage is north-eastward of the castle, in 6 or 7 fathoms water over sandy bottom. Both anchorages are exposed to easterly and southerly winds, and sailing vessels should be small and handy, that they may leave directly there is any indication of wind from those quarters.

Cala Figuera, a small bay more to the eastward, affords to coasting vessels shelter from easterly winds, in 7 or 8 fathoms water, over weedy bottom. Vessels load here with a kind of white clay.

Plan of Escullos bay on 2717.

Escullos bay.—Loma Pelada point is 2 miles eastward of San José bay, and to the northward of it is Escullos bay or Mahomet Arraez, half a mile deep and one mile wide between Escullo islands on the south and Isleta point, with an islet off it, on the north.

Anchorage.—During West and S.W. winds vessels may anchor in all parts of this bay, but that most frequented by small vessels is off the Playa de Escullos. Large sailing vessels should anchor about half a mile eastward of San Felipe castle, in 12 fathoms water, over coarse sand, so as to be able to weather Loma Pelada point should the wind set in from the eastward. Coasting vessels anchor nearer the shore in depths of 8 or 9 fathoms.

As easterly winds blow directly on shore in all these anchorages just described, they should only be considered as temporary, or frequented in cases of necessity, and then every precaution should be taken to be ready to leave, on any indication of the wind changing to that quarter.

Chart 774, Adra to Cartagena.

Polacra point is named from an islet close to it, which seen from a distance appears like a vessel under sail; on the point is a high round hill named Lobos (Wolf) surmounted by a tower; and to the north-

Chart 774, Adra to Cartagena. Var. 13° W.

east of it, the coast forms other points and small bays. The largest bay is Rodalquilar, a mile from Lobos, where there is anchorage suitable for small vessels during westerly winds. A castle stands on a plain a short distance from the beach.

Plan of San Pedro bay on 2717.

San Pedro bay (*Lat. 36° 54′ N., Long. 1° 59′ W.*).—San Pedro castle stands on a height with some houses and farms near it, at the head of a bay, 2½ miles north-eastward from Rodalquilar castle. The bay, formed between Negras point to the south-west and Isleta point, 1½ miles to the north-eastward, is half a mile deep with a small beach at its head, and surrounded by high, steep, rocky cliffs and hilly land, without any other break for a landing place than the beach just mentioned.

Anchorage.—The bay affords anchorage to a limited number of vessels sheltered from south-west, round by west and north, to east. At a little more than a cable from the beach, there are 6 and 7 fathoms water, over sandy bottom. South-easterly winds seldom blow home to the anchorage, but the stronger it blows from this quarter without the bay, the more does it blow off-shore within the bay, so that the only inconvenience is a heavy swell.

Large vessels should not, however, resort here during winter, as the south-westers which blow from time to time are usually very severe. In summer it is much frequented, as it is said to be the best anchorage near Cape de Gata, but vessels should leave the moment the south-west wind commences.

Isleta, an islet of moderate height, clear of danger seaward, but rocky on its inside, lies nearly a cable southward of Isleta point. There is a channel, with 13 feet water, between it and the point, which small vessels use when obliged in south-west winds to leave San Pedro anchorage, and are unable to weather the islet; coasting vessels also enter the bay through this channel with easterly winds.

Supplies. — Fresh beef and a few supplies may be obtained here, and in the cliffs at the foot of the castle there is a spring of excellent water, but difficult to get on board.

Chart 774, Adra to Cartagena.

Cala de Agua Amarga.—This cove lies about 3 miles north-eastward of Isleta point, San Pedro bay, and has a beach. The anchorage is unsafe with winds from East, through south, to W.S.W.; vessels anchor at about one mile from the shore in depths of from 10 to 12 fathoms.

No supplies can be obtained, nor repairs effected.

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Chart 774, Adra to Cartagena. Var. 13° W.

The Custom-house is situated at La Garrucha, where a pilot can be engaged.

Mesa de Roldan (Roland's table) (*see* views facing page) is high tableland, eastward of Cala de Agua Amarga, on which there is a tower in ruins; Media Naranja point is the eastern extreme, and about a mile to the northward is Muertos point. The coast between Cape de Gata and this point is clear of danger (except the rock off the cape), and may be approached to a prudent distance. At 2 to 3 miles seaward the depths are from 45 to 55 fathoms.

LIGHT (*Lat. 36° 56′ N., Long. 1° 54′ W.*).—On the most salient part of the Mesa de Roldan, from a white octagonal tower, 39 feet in height, is exhibited, at an elevation of 725 feet above high water, a *fixed* and *flashing white* light *every two minutes*, which is visible in clear weather from a distance of, the *fixed* 18 miles and the *flashing* 29 miles, but is obscured towards Carboneras bay by a cliff.

Vera gulf, between Media Naranja point to the south-westward and Santa Maria point to the north-eastward, is about 36 miles long and 6 miles deep, and is backed by the Sierra Cabrera (*see* view facing page), the Sierra Almagrera, and other mountains of less importance.

Plan of Carboneras bay on 2717.

Carboneras bay. — Puebla point, about 3 miles northward of Mesa de Roldan, on the east side of Carboneras bay, has shoal water extending from it about 3 cables in a south-south-west direction, and at the same distance south-west is Carboneras or San Andrés islet, from which shoal water extends seaward for 1½ cables in the same direction; 2 cables north-westward of the islet is a small rock named Islote, and between these are depths of 2½ fathoms; Carboneras village stands at the head of the bay.

Anchorage. — The bay affords anchorage in any part during westerly winds, on clean sandy bottom, but the best berth for a large vessel is in 18 fathoms water, with the castle bearing about 345° true distant one mile, or the same distance from Carboneras islet, with the islet and Rayo tower in line, bearing about 12° true. Rayo tower is situated about a mile north-eastward of Carboneras castle and village. This is rather an outside berth, but convenient for a sailing vessel to leave with an easterly wind, and with a probability of weathering Mesa point, which is bold, and clear of danger. Small vessels anchor farther in, south-east of the islet in depths of 5 or 6 fathoms, about half a mile from the shore.

Supplies.—Provisions are scarce; a certain amount of water may be obtained, and fish are plentiful.

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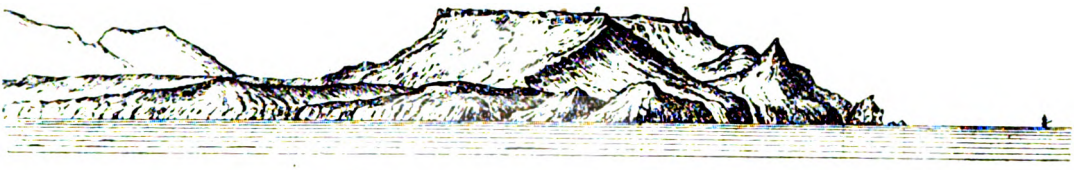
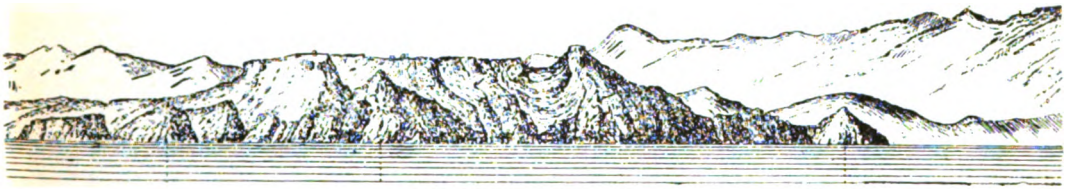
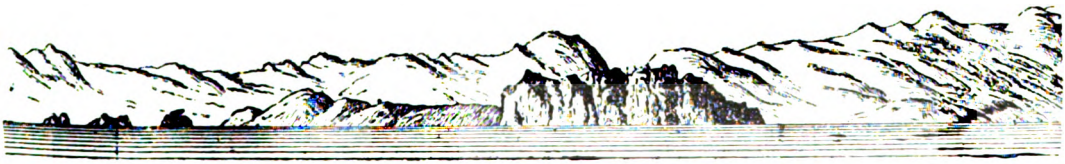
Torre de la Teste. *Torre de la Vela Blanca.* *Cape de Gata lighthouse, bearing 182° true.*



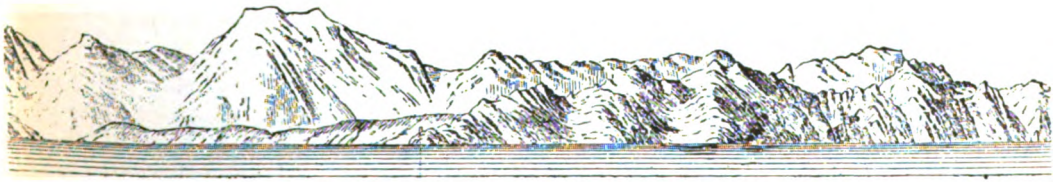
Carabineros. *Mesa de Roldan lighthouse, bearing 15° true.* *Muertos point.* *Media Naranja point.*



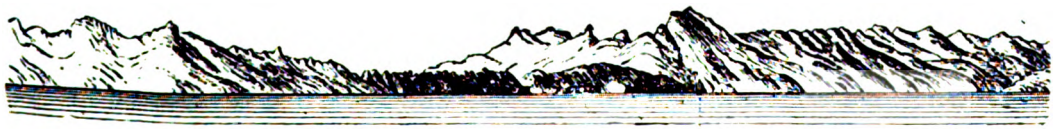
Carabineros. *Mesa de Roldan lighthouse, bearing 330° true, distant 3 miles.* *Muertos point.* *Sierra Cabrera.*



Monte de Aguilas. *Mount Cope, bearing 278° true.*



Cabo and Torre de la Subida, bearing 22° true.



Mazarron lighthouse, bearing 353° true.

Chart 774, Adra to Cartagena. Var. 13° 10′ W.

Mojácar. — Cantal point, on which there is a tower, is 8½ miles north-north-east of Carboneras bay and between, at 4 and 4½ miles, respectively, from Rayo tower, are Peñon and Macenas towers. The town of Mojácar, with about 5,000 inhabitants, stands on a hill of moderate elevation, at the eastern end of the Sierra Cabrera, a mile from the beach and 1¼ miles northward of Cantal point.

LA GARRUCHA.—Garrucha castle is situated 3¼ miles northward of Cantal point, and the town of Garrucha, with a population of 6,324, is a little to the northward, and between the mouths of the small Rios Mopácar and Antas. The town of Vera, of which Garrucha is a suburb, has a population of 8,853, and lies 5 miles northward of La Garrucha, 3½ miles from the coast, and in a plain.

Garrucha is the port of a populous district, with over 200,000 inhabitants, including some six or seven important towns; it is lighted by electricity, and a British Vice-Consul is resident.

LIGHT (*Lat. 37° 10′ N., Long. 1° 49′ W.*). — In a yellow tower 30 feet in height, situated about 50 yards north-westward of the castle of Jesús Nazareno, is exhibited, at an elevation of 63 feet above high water, a *fixed white* light, which is visible in clear weather from a distance of 11 miles.

Anchorage. — There is temporary anchorage near Garrucha beach, which is steep, in from 7½ to 16½ fathoms water at 2 and 2¾ cables distant respectively, but sailing vessels, during north-westerly winds, frequently drag from the anchorage, and may be days in regaining it. With southerly and easterly winds it is necessary to leave.

Communication.—Spanish steamers from Malaga and Motril call twice a month, en route for Alicante, Valencia, and Barcelona, and there is telegraphic communication with Lorca, Vera, and Almeria.

Life-saving apparatus.—A rocket apparatus is stationed at La Garrucha.

Trade. — The exports consist chiefly of iron ore, lead, esparto grass and fruits, and the imports, coals and coke, and timber. In 1910, 167 steam vessels, of the total tonnage of 224,074 tons, entered and cleared.

Coal.—Supplies.—About 2,000 tons of coal are kept in stock. There are 80 lighters of from 8 to 10 tons, and 200 tons can be shipped in 24 hours. Meat, vegetables, and bread are plentiful. Water is supplied by the Garrucha Water Company in carts and lighters.

Winds. — In fine weather the land wind scarcely ever fails by night, or the sea breeze by day. When north-easterly or easterly

Chart 774, Adra to Cartagena. Var. 13° 10′ W.

winds prevail in the offing (not blowing a gale) it will be North at the anchorage, and when the wind is S.W. or West in the offing, it will be N.W. at the anchorage, especially if the land indicates wet. It is common to round Media Naranja point with a strong S.W. wind, and then to find the wind shift to West or N.W. In this case a small vessel should close the coast, so as to have smoother water and to carry a fair wind.

Rio Almanzora or Cuevas.—From Garrucha castle the coast trends north-eastward for 5 miles to the termination of the low sandy beach near the mouth of the Rio Almanzora, known also as the Guadalmanzor or Cuevas. The river, which passes close to the north of the town of Cuevas de Vera, is a considerable height in winter, but has little water in summer. Vessels anchor off it to ship cargo, but must first call at La Garrucha.

Villaricos anchorage (*Lat. 37° 14′ N., Long. 1° 46′ W.*).—A little north of the mouth of the Rio Almanzora is Villaricos tower, known also as Monrás castle, standing on a point, a termination of the Sierra Almagrera. From this tower the coast is high and steep, and is backed by the Sierra Almagrera, well known from its rich argentiferous mines, and forming several remarkable peaks, the highest of which, the Puntal del Ruso, is 1,204 feet above the sea.

Anchorage.—There is anchorage, sheltered from westerly and strong N.W. winds, off the town, in from 5 to 14 fathoms water, over sandy bottom and good holding ground, much frequented by vessels laden with coal and seeking cargoes of ore.

The town of Villaricos is built on the site, and with the débris, of a Roman town (the ancient Urci); it is lighted by electricity. Numerous smelting factories and other buildings are near the beach and in the neighbourhood.

Coal, supplies.—About 1,000 tons of coal is usually kept in stock. Fresh provisions and water may be obtained.

Winds.—Although south-easterly and easterly winds blow directly on-shore at this anchorage, they do not generally blow home, but easterly winds, which prevail in February and March, are then considered dangerous. South-westerly winds do not often blow home either, and those from south are rare; hence with good ground tackling vessels nearly always ride out the bad weather at this anchorage.

In the evening there is generally a land wind or a calm; it would, nevertheless, be prudent to put to sea should a change indicate an easterly wind which generally begins with a light breeze from S.S.E., gradually increases, and is accompanied at times by showers. Easterly

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Chart 774, Adra to Cartagena. Var. 13°.10′ W.

winds sometimes shift to N.W., which is the prevailing and strongest wind, and impedes loading operations.

Terreros island.—San Juan de los Terreros castle stands on a steep rocky headland of moderate elevation, and about 4 cables southward of Cabo de San Juan de los Terreros is the island of Terreros, about 130 yards in length and 157 feet high, with 5 fathoms water, over rocky bottom, about 30 yards distant. The passage between it and the point is clear of danger, with 6 fathoms water, over sand and rock. With strong south-easterly winds the whole passage is covered with breakers.

Tunny fishery.—Tunny nets are sometimes laid out during the season, 1st February to 30th October, from Terreros island. *See* page 73, for Lights, marks, and caution.

Plan of Port Aguilas on 2717.

PORT AGUILAS, about 5 miles north-eastward of Terreros island, is 6 cables wide east and west, and 3 cables deep north and south, and open to the southward; but small bays on either side of Monte de Aguilas afford shelter to small vessels from easterly and westerly winds. About 1½ miles south-west of the port, is the division between the provinces of Almeria and Murcia.

Puerto Levante, the bay on the east side of Monte de Aguilas, and between it and Aguilucho point is low and sandy at its head, but the two extremes rise abruptly; Monte de Aguilas on the west is about 280 feet high, red in colour, conical in form, and on it is the castle of San Juan, which commands the anchorage.

Tunny fishery.—Tunny nets are sometimes laid out during the season, 1st February to 30th October, off the port. *See* page 73, for Lights, marks, and caution.

Breakwater.—On the west side of Puerto Levante a breakwater extends a distance of 324 yards in a north-easterly direction.

LIGHTS (*Lat. 37° 24′ N., Long. 1° 34′ W.*).—On Negra point, the west side of the entrance to Puerto Levante, a light grey octagonal tower, 27 feet in height, exhibits, at an elevation of 42 feet above high water, a *fixed white* light, which is visible, in clear weather, from a distance of 10 miles.

A *fixed red* light, elevated 31 feet above high water, is exhibited from a wooden column near the end of the breakwater works, and is visible, in clear weather, from a distance of 7 miles.

Anchorage.—The breakwater affords shelter from winds between S.W. and S.E., and if not from winds further eastward, vessels may shift to the eastern side of the bay, and anchor, in 5½ fathoms water,

Plan of Port Aguilas on 2717. Var. 13° 10′ W.

with Aguilucho point bearing 144° true, distant about half a cable, sheltered from easterly winds as far round as S.E. In the middle of the bight there are from 7 to 9 fathoms water, and 12 fathoms in the entrance.

Town (*Lat. 37° 24′ N., Long. 1° 34′ W.*).—The town of Aguilas, on the plain at the foot of the hill, on the north-west side of the head, extends along the beach of a cove named Puerto Poniente, contained in the year 1910 a population of 15,971, and is lighted by electricity; a British Vice-Consul is resident. A few boats, moored in tiers, are sheltered from all winds, others are hauled up in the cove, and some are built here.

Communication.—Coasting steamers call here weekly, touching at Cartagena, Alicante, and Valencia on their way to Barcelona, and downwards at Malaga and Cadiz. There is railway communication with Baza and to Madrid, viâ Murcia, also telegraphic communication. The depôt of the Great Southern of Spain Railway Company is established here.

Supplies.—Provisions are plentiful, and very good water may be obtained from a small floating tank, but warning is required as the water has to be brought into the town.

Trade. — There are several factories for smelting ore from the adjacent mines, these, together with the agricultural produce, have conduced greatly to the importance of the town, which is the great emporium for the purpose and shipment of esparto grass. Hydraulic presses are now in use, to bring the fibre into bales of convenient size. Other exports are iron ore, oranges, grapes, and lemons, and the imports consist of coal, patent fuel, and coke. The coal imported is solely for the immediate requirements of the railway and sugar mills company.

Shipping. — In 1910, 173 steam vessels, of a total tonnage of 227,583 tons, entered the port, but this includes the shipping at Puerto del Hornillo.

Climate.—Aguilas enjoys an equable and pleasant climate from October to May. In the hottest season the thermometer rarely rises to 82° Fahr. in the shade; in the winter the average is 61°, seldom dropping to 50° Fahr.

Winds.—The strongest winds at Port Aguilas during winter are those from S.E. and N.E.; strong westerly winds blow in heavy squalls. In summer the winds vary from S.E. to S.W.

Currents. — The currents in the offing follow the direction of the wind.

General charts 774, 2717, 1, 2158a, 449.

Plan of Port Aguilas on 2717. Var. 13° 10′ W.

Puerto del Hornillo.—Monte de la Aguilica, on the eastern side of entrance to Puerto Levante, is a mass of steep rocky cliffs forming a small peninsula with a narrow neck, having on its eastern side, Puerto del Hornillo, about 5 cables long east and west, and 2½ cables deep, and somewhat similar in form to Puerto Levante.

In 1910, of 168 steam vessels that cleared the Custom-house at Aguilas, 110 loaded at Puerto del Hornillo.

Pier. — A pier, with concrete base and steel superstructure, has been constructed for loading iron ore; it is about 170 yards in length, with 45 feet water at its extremity, and accommodates two vessels, which are loaded by wagons and shoots. Excellent dispatch is afforded, and during the year 1910 not one vessel had to put to sea from bad weather whilst loading.

Light (*Lat. 37° 24′ N., Long. 1° 33′ W.*).—From a black iron support, 4 feet high, at the pier end, is exhibited, at an elevation of 45 feet above high water, a *fixed green* light, visible in clear weather from a distance of 5 miles. For sectors, *see* Light list.

Anchorage. — The anchorage is somewhat sheltered by Fraile islet, which is moderately high, rocky, and lies a little from the coast, nearly east and west.

The cove is frequented by guard and coasting vessels, for shelter from S.W. winds, and coasters anchor in from 5 to 7½ fathoms water, over weedy bottom, under the projecting easterly point, where they are sheltered from S.W.

Tunny fishery. — Tunny nets are laid out annually during the season, 1st February to 30th October, for a distance of 4½ cables eastward of Fraile islet. *See* page 73, for Lights, marks, and caution.

Chart 774, Adra to Cartagena.

Mount Cope, about 5 miles eastward of San Juan de Aguilas castle, is 824 feet above the sea, nearly isolated, and of a red colour; it extends one mile in a north-easterly direction, is bold, and steep-to. *See* view, page 156.

Bardina cove.—Bardina cove, on the west side of Mount Cope, is about 1½ miles wide, 6 cables deep, with 7½ fathoms water over sandy bottom, at 2 cables from the beach, and 13 fathoms over sand and weeds, about a cable from the shore on the hill side. It affords shelter from easterly winds, and small vessels which go well into the cove are sheltered from S.E., and only exposed to southerly winds, which seldom blow, even in winter.

General charts 774, 2717, 1, 2158a, 449.

Plan of Cape anchorage on 2717. Var. 13° 10′ W.

Cope anchorage, the bay on the eastern side of Mount Cope, has a tower on the plain near the shore, near which there are houses and fishing huts. It affords shelter from winds between N.W. and S.W., and vessels may ride out any gale when anchored to the north of Cruz point, the north-east extreme of the mount, and nearly opposite, and distant a third of a mile from the tower, in 8 or 9 fathoms water, over sandy bottom. But, in this position, should the wind change to the eastward, a sailing vessel would be embayed; it would therefore be safer to anchor north-eastward of the point. Easterly winds generally commence at N.E., which facilitates leaving the bay.

Supplies of fresh provisions may be procured, but they are expensive; water may be obtained from a spring at the foot of the mount, at the head of the bay.

Chart 774, Adra to Cartagena.

Mazarron gulf is so named from the prevalence of the land winds; its shore, between Monte Cope and Cabo de la Subida (*see* view, page 156), a distance of 17 miles, is, for the most part, bold and clear of danger, and may be approached to a moderate distance. The town of Mazarron is situated in the eastern part of the gulf, about 4 miles inland, and contains about 16,000 inhabitants; here are factories of alum and of ochre.

Plan of Mazarron and Subida bays on 2717.

Mazarron bay, the eastern part of Mazarron gulf, and formed between Punta Aviones and Cabo de la Subida to the eastward, is 4 miles wide east and west, and scarcely a mile deep. The eastern part of the bay is higher than the western, and its shores nearly all sand, from which the water deepens gradually to 3 fathoms at distances varying from one to 3 cables; and then quickly to 7 and 10 fathoms.

LIGHT (*Lat. 37° 33′ N., Long. 1° 15′ W.*).—A *fixed white* light is exhibited, at an elevation of 200 feet above high water, from a dark grey conical tower, 28 feet in height; the lighthouse stands on a small hill on the south point of Mazarron bay, and the light is visible in clear weather from a distance of 11 miles. *See* view, page 156.

Shoals.—La Galerica rocks lie about 4 cables northward of the lighthouse and about 1½ cables from the shore. Fuera bank, with 9 fathoms over it, lies with the lighthouse bearing 300° true, distant 4 cables, and Dentro bank, also with 9 fathoms over it, with the lighthouse bearing 240° true, distant 9 cables.

Tunny fishery.—Tunny nets are laid out during the season, 1st February to 30th October, in Mazarron bay, the centre being

Plan of Mazarron and Subida bays on 2717. Var. 13° 10′ W.

situated about one mile southward of Cabezo del Mojon. *See* page 73, for Lights, marks, and caution.

Pilotage here is compulsory, although it is practically an open bay, and the rates are as follows:—

	Up to 16ft. 8in.	From 16ft. 8in.	
PILOTAGE.			
Vessels—	Pesetas.	Pesetas.	c.
Up to 200 tons gross registered tonnage...	15	15	0
201 to 500 „ „ „ „ ...	25	22	50
501 1,000 „ „ „ „ ...	40	35	0
1,001 tons gross registered tonnage and above	50	42	50
MOORING.			
Vessels—			
50 to 100 tons gross registered tonnage...	4	4	0
101 200 „ „ „ „ ...	8	7	50
201 500 „ „ „ „ ...	15	12	50
501 1,000 „ „ „ „ ...	20	17	50
1,001 2,000 „ „ „ „ ...	30	25	0
2,001 tons gross registered tonnage and above	50	32	50
Compulsory extra pilotage down the coast—			
To—			
La Calera (east)	30	25	0
Parazuelos (west)	50	40	0

Anchorage (*Lat. 37° 33′ N., Long. 1° 15′ W.*).—The best berth for a moderate sized vessel requiring shelter from westerly winds is northward of the lighthouse, and eastward of the village, in about 8 fathoms water, over weed.

Village. — Close to the north-west of the lighthouse is the village of Mazarron, one of the largest lead foundries in the world, with about 4,000 inhabitants, and from which a considerable amount of mining produce is annually shipped. A British Consular Agent is resident.

Communication.—There is a high road between Mazarron and Cartagena. A railway was projected between Cartagena and Aguilas, passing close to Mazarron, but it is still in contemplation only.

Coal and supplies. — About 6,000 tons of coal are kept in stock, for the owners' use only, but some can be obtained in an emergency. There are 31 lighters of about 8 tons each.

Supplies of fresh meat, bread, and vegetables are moderately plentiful; water, of indifferent quality, can be obtained in casks.

Trade.—The exports consist chiefly of silver, lead, and iron ore, and imports of coal and coke. The import of coal is about 30,000 tons annually.

General charts 774, 2717, 1, 2158a, 449.

Plan of Mazarron and Subida bays on 2717. Var. 13° 10′ W.

Shipping.—In 1910, 57 steam vessels with a total tonnage of 63,254 tons, entered the port and 5 sailing vessels with a total tonnage of 912 tons.

Subida bay affords anchorage in 7½ fathoms water, over sandy bottom, at 2 or 3 cables northward of Cabo de la Subida, sheltered from easterly winds, with room for several vessels. The bay is open to the south-west; in summer the winds from that quarter are not strong, but during winter they blow with violence.

Tunny fishery.—Tunny nets are laid out during the season, 1st February to 30th October, for a distance of about 6 cables from the coast in the neighbourhood of Cabo de la Subida. *See* page 73, for Lights, marks, and caution.

Chart 774, Adra to Cartagena.

Cape Tiñoso, high, precipitous, of a red colour, and conspicuous at a distance, should not be approached by sailing vessels within the distances of 2 or 3 miles to avoid the light winds, calms, and swell in its vicinity. South-westerly winds are weakened by the high land, and a vessel, too close to the cape, may be exposed to the sea and strong currents, which follow the direction of the wind. If bound to Subida anchorage with easterly or south-easterly winds, a berth should also be given to the cape, to avoid the squalls and eddies which blow over the high land, and a sailing vessel should keep in the steady breeze.

LIGHT (*Lat. 37° 32′ N., Long. 1° 6′ W.*).—A red circular lighthouse, surmounting a red square building, 33 feet in height, stands near the extreme of Cape Tiñoso, and exhibits, at an elevation of 479 feet above high water, a *fixed white* light, which is visible in clear weather from a distance of 24 miles.

Anchorages.—To the eastward of Cape Tiñoso the coast forms a deep bight, and about 1½ miles from the cape is Cala Salitrona or Salitrosa, and at the termination of a ravine there is a small beach where fishermen haul up their boats. Coasting vessels anchor in the cove when the wind is too strong to enable them to round Cape Tiñoso.

Botetes, about one mile northward of Cala Salitrona, affords better anchorage, off a small guard-house, in 8½ or 9 fathoms water, as here a sailing vessel can get under way in case of an easterly wind; a rock, with a depth of 3 feet, is situated about 1½ cables southward of the beach at the head of this anchorage. Cala del Portus, a small bay, with a beach, about 3½ miles to the north-eastward of the cape, affords anchorage to coasters sheltered from north-westerly winds, but it is little frequented, being so near Cartagena.

Roldan head.—Cabezo de Roldan, a remarkable mountain and excellent distant mark, is 1,837 feet high, and isolated. Palomas islet,

Chart 774, Adra to Cartagena. Var. 13° 10′ W.

of moderate height, with rocks around it, lies southward of the mountain, forming a passage between it and the shore 6 cables wide, having 7½ to 14 fathoms water over sand and rocks. Thence the coast continues high to the eastward for 1½ miles, to the west point of Algamecas bay, near which is an islet named Terrosa, connected to the coast by a strip of sand.

Plan 1194, Cartagena harbour.

Cartagena approach. — The bay between Terrosa islet and Podadera point, on the west side of the entrance to Cartagena, is 1½ miles across, and in it are Algameca Grande and Algameca Chica, two coves, the former and western being the larger; they are resorted to for anchorage with off-shore winds. Podadera point is bold, of moderate height, surmounted by a fort and steep-to; at about 3 cables north-eastward is Navidad point and battery.

Escombrera islet (the Escámbreria of the Romans) lies nearly a quarter of a mile westward of the south point of the bay. It is a quarter of a mile in length east and west, half a cable in breadth, cliffy, and rugged.

LIGHT (*Lat. 37° 33′ N., Long. 0° 58′ W.*).—A *fixed white* light is exhibited from a yellow circular tower, 28 feet in height, and surmounting a square yellow building; it stands on the most elevated part of Escombrera islet, and the light, shown at an elevation of 212 feet above the level of the sea, is visible in clear weather from a distance of 15 miles.

Tunny fishery.—The passage between the islet and point has from 11 to 18 fathoms water in mid-channel, but its use is prohibited on account of the fishing nets, for tunny, which are placed in it.

Escombrera rock, lying 1½ cables westward from Escombrera islet, has a depth of 5½ fathoms over it.

The channel between the island and the rock, with depths of from 9 to 22 fathoms in it, has a patch of 5 fathoms nearly in mid-channel.

Anchorage.—During winter, when the wind is at times off-shore from N.E. to N.W., temporary anchorage with good holding will be found northward of Escombrera islet.

Escombrera bay is described on page 169.

Trinca Botijas point. — Losas rocks. — On the east side, and about 4 cables south of the entrance to the harbour is Trinca Botijas point, on which there are two batteries, and nearly a cable north-westward of the point Trinca Botijas rock has 2 fathoms water over it.

Losas rocks, on which the depths are from 1½ to 9 feet, with from

Plan 1194, Cartagena harbour. Var. 13° 10′ W.

3 to 6 fathoms between them, lie southward of Trinca Botijas point, and about one cable from the coast.

Beacon.—A beacon, painted black and white in horizontal stripes, and with "La Losas" lettered on it, stands on the outer rock.

Santa Ana point and rock. — Santa Ana point, 3 cables northward of Trinca Botijas point, is low, rather salient, and has a fort on it, and about half a cable from the point, Santa Ana rock, on which the depth is about 10 feet, is steep-to, there being 10 fathoms water near it.

Beacon.—A beacon, consisting of an iron column surmounted by a ball, the top of which is about 21 feet above the sea, stands on the west side of Santa Ana rock.

The depth is upwards of 4 fathoms about a tenth of a cable westward of the beacon.

Currents.—Off Cape Palos there is commonly a current setting south-eastward which becomes stronger as the distance from the land is increased. From the cape to Cartagena the coast is clear of danger, and may be approached to the distance of half a mile. Cape Tiñoso should not be approached too near, especially with south-westerly winds, as the current sets towards the land, and the wind may fall light.

CARTAGENA (*Lat. 37° 35′ N., Long. 0° 59′ W.*). — A chain of mountains extends east and west along the coast between Capes Tiñoso and Palos, and a break or opening in it indicates the entrance to Cartagena harbour, the shores of which are very irregular in outline; it recedes about a mile in a northerly direction, varies in breadth from 2½ cables at the entrance to nearly a mile inside, and is bounded on either side by hills. Being naturally sheltered by the land from all winds, except those from South to S.W., and from these winds well protected by two breakwaters, it is the only safe port on the south coast of Spain capable of receiving all classes of vessels.

The harbour is protected on the west by the batteries on the hills of Atalaya and Galeras, the former being 790 feet, and the latter 656 feet above the sea; both are good marks at sea; and on the east by those of Despeñaperros and Moros, besides Fort San Julian, which stands on the hill of this name on the east side of entrance at an elevation of 951 feet above the sea. There are also several batteries on each side of the entrance.

Depths. — The depths at the entrance are from 7 to 12 fathoms. Between Curra breakwater extreme and the shore 5 to 5½ fathoms. In the outer harbour 3¼ to 7 fathoms, and in the Basin 2¼ to 5½ fathoms.

General charts 774, 1372, 2717, 1, 2158a, 449.

Plan 1194, Cartagena harbour. Var. 13° 16′ W.

Breakwaters. — The outer breakwater on the west side of the entrance extends about 200 yards in a south-easterly direction from Navidad point, and the inner one, named Curra breakwater, on the east side of the harbour, has a westerly direction from close northward of the battery of San Leandro, for a distance of about 800 yards.

LIGHTS (*Lat. 37° 35′ N., Long. 0° 59′ W.*). — **Navidad (West) Breakwater.**—A *fixed red* light is exhibited from a red cylindrical stone tower, 34 feet high, 26 yards within the circular head of the breakwater of Point Navidad, at an elevation of 48 feet above the sea; in clear weather the light is visible from a distance of 7 miles.

Curra (East) Breakwater. — On the circular head of the Curra breakwater, from a white cylindrical stone tower, 34 feet high, a *fixed green* light is exhibited at an elevation of 48 feet above the sea, and is visible in clear weather from a distance of 5 miles.

Signal station.—Semaphore.—A semaphore is established at Castillo de Galeras, and communicates with vessels by means of the International code of signals, the building on which the semaphore is placed is painted in black and white horizontal bands.

Pilots. — Large vessels, and strangers, should take a pilot: the pilot signal is made from the watch-tower at Castillo de Galeras, when vessels are approaching. Unless the pilot flag is shown, vessels will be boarded by the Government pilot, and moored in the position appointed them. For pilotage regulations, *see* page 58.

The rates are as follows:—

PILOTAGE.

Vessels—	Pesetas.
Not exceeding 2,000 tons gross registered tonnage ...	12
Exceeding 2,000 tons gross registered tonnage ...	15
Plus 1 c. per ton of gross registered tonnage.	

MOORING.

All vessels	6
Plus ½ c. per ton of gross registered tonnage.	

Harbour. — Inside Curra breakwater the depths are 6 to 7 fathoms, shoaling gradually towards the shore; about 26 feet can, however, be carried into the basin. The northern part of the harbour, near the mercantile quay, Muelle de Alfonso XII., has been deepened, and vessels of considerable size can discharge alongside the quay, which is approaching completion. The harbour is being dredged to a minimum depth of 28 feet.

In the north-west corner of the harbour is the arsenal and basin, where vessels of war alone are allowed to enter. The basin is 3 cables in length north and south, and nearly 2 cables in breadth east and west, with general depths of 4½ and 5 fathoms water, over muddy

Plan 1194, Cartagena harbour. Var. 13° 10′ W.

bottom; its entrance is open to the eastward, and secured by a boom. With westerly and south-westerly winds, heavy squalls rush down the hills which border the western and southern sides of the basin.

Directions.—Cartagena harbour will be known at a distance by Roldan head (page 164), Forts Atalaya and San Julian, and by the conspicuous break in the land between Capes Tiñoso and Negrete.

Vessels entering Cartagena harbour from the westward with a fair wind may approach Podadera point to the distance of a cable, and should then keep along the western side of entrance, passing Navidad breakwater, and when past Curra breakwater anchor as directed by the harbour authorities.

On the north side of Curra breakwater are bollards and rings for the stern fastenings of large vessels.

A sailing vessel from the eastward should, during strong easterly winds, give Cape Agua a good berth, as heavy squalls then blow over the land. Cape Agua is high and steep with its summits terminating in peaks. Having passed southward of Escombrera islet, the course should not be altered to the northward until Santa Ana point on the east side of entrance, bears more than 3° true, which clears Escombrera rock. The use of the channel eastward of Escombrera island is prohibited on account of the tunny nets.

There are no tides in Cartagena harbour, but with winds from South to S.W. the water rises from one to 1½ feet, and North to N.E. winds have a contrary effect.

Town (*Lat. 37° 35′ N., Long. 0° 59′ W.*).—The town of Cartagena (the Carthogo Nova of Asdrubal—the Carthaginian general—and Spartaria of the Romans) occupies the declivity of a hill and a small plain at the head of the harbour. It has good streets, numerous churches, convents, hospitals, public schools, &c., and, with its suburbs, contained by the last census a population of 103,473. Large electric works supply light to the town, to the surrounding villages, and to La Union, a mining centre 9 miles distant. A British Vice-Consul is resident.

It is fortified and surrounded by a wall, and in the southern part of it is a circular hill, on the summit of which are the ruins of a Roman castle. A little to the south-east of the town is the suburb of Santa Lucia, with foundries and other buildings, beyond which are the victualling establishment and wharf.

Communication.—Steamers once a week to and from Marseille, London, and Oran; most lines of coasting steamers call. A fortnightly steamer to Canary islands calling at Malaga and Melilla.

Railway communication with Torrevieja, and Alicante, thence with Madrid, also a railway to Lorca. Steam tramway to Herrerias de la Union in the mining district and to Santa Lucia. Telegraphic communication with all parts. The telegraph office is always open.

General charts 774, 132, 2717, 1, 2158a, 449.

Plan 1194, Cartagena harbour. Var. 13° 10′ W.

The port is also connected with the Rio Segura, northward, by the Lorca canal.

Coal and supplies. — About 2,000 tons of coal are kept in stock by the Government contractor, which is the only coal stocked for bunkering; there are a number of lighters. About 500 tons of coal can be put on board during an ordinary working day, and work is not allowed at night.

Supplies of fresh provisions may be procured, but they are scarce, and notice is required for large quantities; water is supplied from a water boat and pipe on quay, but it is not very good.

Docks and patent slip.—There is a dry dock and a floating dock belonging to the Government, and a patent slip owned by a private company. For particulars, *see* Appendix I.

Repairs. — All kinds of repairs can be executed at the Government dockyard, and there are also four private establishments, in and near Cartagena, that can execute considerable repairs to machinery. Sheers, on east side of the basin, will lift 100 tons; there is one 5-ton steam hammer and other smaller; a vessel of 7,000 tons has been built.

Landing. — The usual landing place is at the Puerta del Mar, a little east of the basin, where there is a mole for the convenience of coasting vessels.

Sanitary station.—Cartagena is a first-class sanitary station: here vessels can have hull and cargo disinfected and rats destroyed. *See* also page 9.

Trade.—At Cartagena there are manufactories of glass, earthenware, sail cloth, and Esparto rope, mining and lead smelting being the great industrial branches of the district. The principal exports are iron and manganiferous ores, blende ore, silver lead, silver, oranges, and lemons. The imports are chiefly coals and coke, phosphate of lime, and chemical manures.

Shipping. — In 1910, 382 steam vessels entered the port with a total tonnage of 425,969 tons, and 8 sailing vessels with a total tonnage of 5,331 tons.

Winds and weather. — In summer south-westerly winds, generally called virazones, are regular at Cartagena; they set in at 10 a.m. and blow until sunset, but in winter they last all night. In fine weather the land wind prevails in the morning, generally till 8 or 9 o'clock, which renders it easy for vessels to leave the port. *See* Meteorological table in Appendix III.

Escombrera bay (*Lat. 37° 33′ N., Long. 0° 57′ W.*), the large inlet on the south-east side of the entrance of Cartagena, is sheltered from N.W. round north to S.E.; it is about three-quarters

Plan 1194, Cartagena harbour. Var. 13° W.

of a mile wide at the entrance and 6 cables deep, with from 5 to 15 fathoms water; in the deeper part of the bay the bottom is rocky. Under the name of El Hoyo the bay extends eastward for about 4 cables and is very shallow; on its south shore is the village of Escombrera.

Anchorage.—There is room here for a large number of vessels, but the most frequented anchorage is on the southern shore, in 8 fathoms water, off a foundry.

Escombrera islet, light, and rock are described on page 165.

Plan of Porman bay on 2717.

PORMAN BAY (ancient Portus Magnus), 5½ miles eastward of Escombrera point, is nearly three-quarters of a mile wide and half a mile deep, and in the middle has 8 fathoms water, over sandy bottom, gradually decreasing to the shore. At the head of the bay there is a sandy beach, but on either side of the entrance the land is high, particularly on the west, which is rocky. Porman has lead mines in its vicinity, iron ore is obtained. The population of the town is about 4,000. Formerly incorporated with Cartagena, it was declared an independent port in 1898 and vessels may now proceed direct without being entered and cleared or obtaining pratique at Cartagena. There is a Consular Agent at Porman.

LIGHT (*Lat. 37° 34′ N., Long. 0° 50′ W.*).—On the summit of a hill over Punta Chapa on the east side of entrance to Porman bay, 35 yards from the sea, is a yellow circular tower 27 feet in height, and rising from the centre of the keeper's dwelling: it exhibits, at an elevation of 162 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 11 miles through an arc of 270°.

Porman rock, situated 2¼ cables north-westward of Punta Chapa, and about a cable from Punta del Barco, is a rocky shoal with 11 feet water over it, on which the sea breaks with on-shore winds.

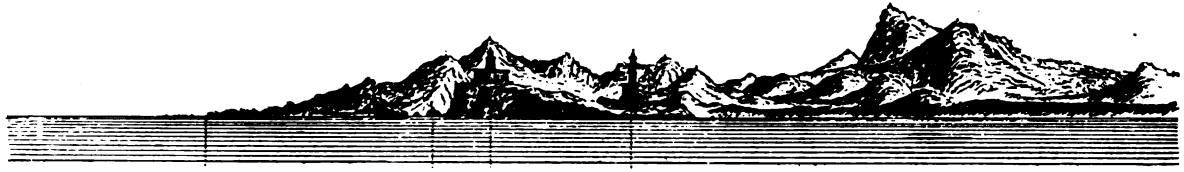
Beacon. — Porman rock is marked by a white iron beacon, surmounted by a ball.

Mooring buoys. — Four mooring buoys are laid down in the bay.

Anchorage. — The best anchorage is rather nearer the western than the eastern shore, where vessels are sheltered from south-westerly winds, but small vessels which resort to this port for shelter from easterly winds, anchor on the east side of a small sandy beach. Southerly winds seldom blow in the bay, but generally send in a sea.

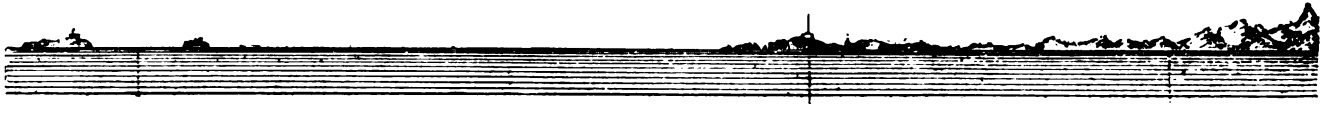
Communication.—The Transatlantic steamers call weekly from Oran, generally returning the same day.

General charts 774, 1372, 2717, 1, 2158a, 449.

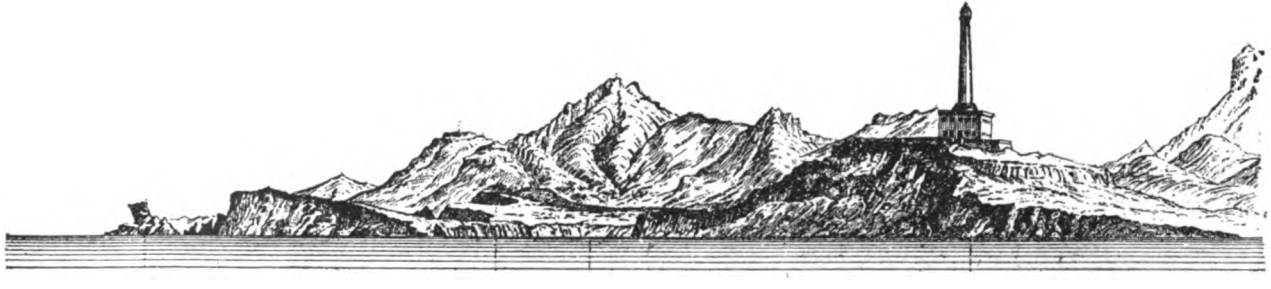


Espada point. *Hormiga grande lighthouse.* *Cape Palos lighthouse.* *Los Juncos.*

View from Fuera bank.



Hormiga grande. *Hormiga chica.* *Cape Palos lighthouse, bearing 170° true, distant 5 miles.*



Espada point. *Monte Eschucha.* *Cape Palos lighthouse, bearing 233° true, distant about one mile.* *Cape Negrete (distant).*

Plan of Porman bay on 2717. Var. 13° W.

Coal. — About 800 tons are usually kept in stock; about 200 tons can be loaded in 24 hours; there are some lighters of 10 to 14 tons each.

Supplies may be procured in abundance, and good water may be obtained in casks.

Trade.—The principal exports are iron and zinc ores and lead; the principal imports are coal and coke.

Shipping. — In 1910, 94 vessels, with a total tonnage of 126,036 tons, entered and cleared the port. Of this number nearly one-half were British.

Charts 774, 1372.

Cape Negrete, so named from its dark colour, and situated about a mile to the eastward of Punta Chapa, is high and steep, and, 2¾ miles north-west of it, is Santi Spiritus mountain, 1,447 feet high.

Tunny fishery. — Tunny nets are laid out during the season, 1st February to 30th October, in a south-westerly direction, for about 7 cables from Cape Negrete; Cape Tiñoso in line with Cape Agua, bearing 262° true, marks the seaward extremity. (*See* page 73, for Lights, marks, and caution.) Cape Negrete should be given a berth of at least one mile in passing.

CAPE PALOS.—From Cape Negrete the land falls irregularly, for a distance of 7 miles, towards Cape Palos, which is low, terminates in a hummock, and is easily recognised and approached to a prudent distance. Between the capes are some small beaches and, near the sea, two isolated conical hills, named Los Juncos, which form good distant marks for Cape Palos, either from the south-west or north-east. Monte Escucha, nearly 2 miles south-west of the cape, is 460 feet high.

LIGHT (*Lat. 37° 38′ N., Long. 0° 41′ W.*). — On the cape, 90 yards from the sea, a grey conical tower, 165 feet in height, exhibits, at an elevation of 263 feet above the sea, a *fixed* and *flashing white* light *every minute*, which is visible in clear weather, the *fixed* from a distance of 15 miles, the *flashing* 23 miles. *See* views facing page.

Life-saving apparatus. — A rocket apparatus is maintained at Cape Palos.

Currents.—In the vicinity of Cape Palos the currents are strong, generally set to the south-eastward, and are stronger as the distance from the island is increased.

General charts 2717, 1766, 1, 2158a, 449.

CHAPTER III.

THE EAST COAST OF SPAIN.—FROM CAPE PALOS TO CAPE CREUS.

(Lat. 37° 30′ N. to Lat. 42° 30′ N.).
(Long. 0° 55′ W. to Long. 3° 20′ E.).

VARIATION IN 1912.—Decreasing 6′ to 7′ annually.

Chart 1372, Cartagena to Cape San Antonio. Var. 13° W.

Las HORMIGAS. — About 2¼ miles north-eastward from Cape Palos, are Las Hormigas, two small low islets a little above the level of the sea. Hormiga grande, the larger, is 2¼ miles from the cape, and at a short distance to the south-west of it is the Hormiga chica, which is merely a rock. (*See* views, page 171.) Between the islets and the cape the passage, with the exception of the shoals to be mentioned, has 23 and 24 fathoms water.

LIGHT (*Lat. 37° 39′ N., Long. 0° 38′ W.*). — A white conical tower, 41 feet in height, stands on the most elevated part of Hormiga grande, and exhibits, at an elevation of 82 feet above the sea, a *group occulting white* light, showing *three* eclipses *every fifteen seconds*, thus:—light, *four and a half seconds;* eclipse, *one and a half seconds:* light, *four and a half seconds;* eclipse, *one and a half seconds;* light, *one and a half seconds:* eclipse, *one and a half seconds*, which is visible in clear weather from a distance of 10 miles.

Mosquito rock, a small rocky head, with a least depth of 9 feet over it, lies about one cable south-eastward of the lighthouse. Between the rock and Hormiga grande is a channel, 100 yards wide, with depths of 10 to 17 fathoms.

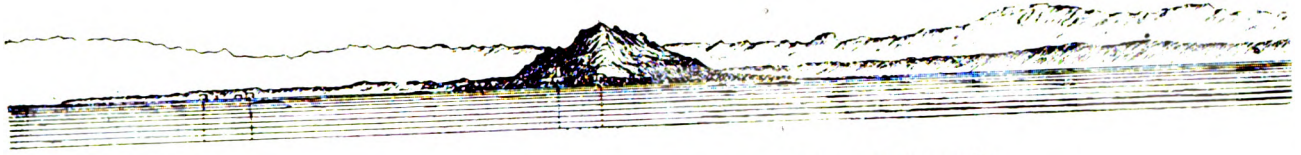
Dentro bank, half a mile south-westward from Hormiga chica, is rocky, with 11 feet water over it, and depths of from 10 to 26 fathoms between.

A shoal, about 1½ cables in extent, and having depths of from 4½ to 6 fathoms, lies with the extremity of Cape Palos bearing about 230° true; the outer part of the shoal is distant 6 cables from the cape.

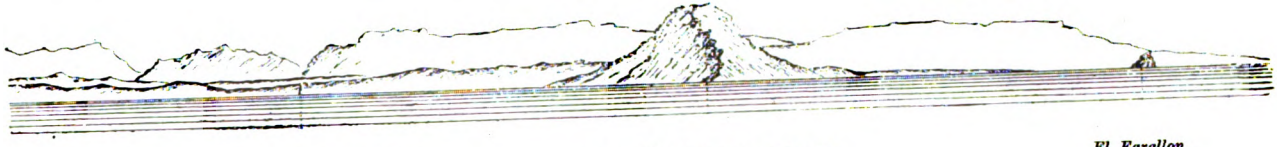
Vessels using Hormigas channel should pass between Hormiga chica and Dentro bank, but this channel should not be used without local knowledge.

General charts 2717, 1766, 1, 2158a, 449.

To face page 175.]



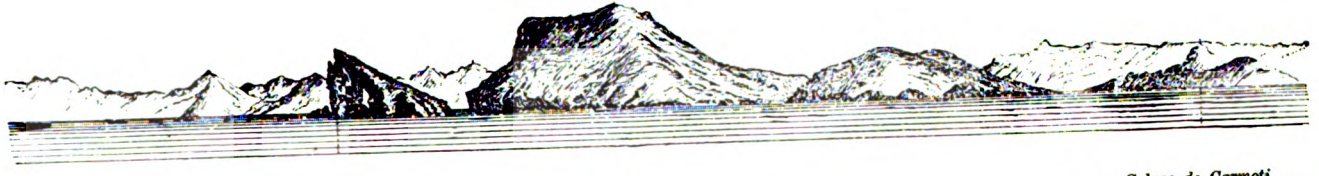
Cabezo Gordo, bearing 291° true distant 11¼ miles.
Estacio point lighthouse.



Estacio point lighthouse.
Sierra Callosa.

Grosa island, bearing 345° true, distant 5½ miles.

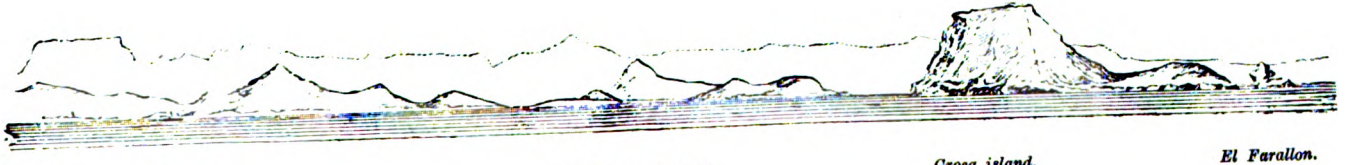
El Farallon.



El Farallon.

Grosa island.

Cabezo de Carmoti, bearing 248° true, distant 7¾ miles.



Mesa de Roldan (very faint).

Cabezo de Carmoti.

Grosa island.

El Farallon.

Chart 1372, Cartagena to Cape San Antonio. Var. 13° W.

Fuera bank. — A rocky shoal half a cable in extent, with 8 feet water on it, lies north-eastward, distant two-thirds of a mile from Hormiga grande, with the highest part of Grosa island bearing about 320° true, distant 5 miles. Between this shoal and Hormiga grande, there is 38 fathoms water in mid-channel, and 19 fathoms close to the islet. The position of both these shoals will be known by the discoloured water. *See* view, page 171.

Anchorage.—On the north side of Cape Palos there is anchorage, sheltered from the south-west, but exposed to the eastward, on which account it is only used by small vessels that can leave with facility.

Mar Menor.—From Cape Palos a narrow strip of low land named La Manga, forming an extensive sandy beach, extends to the northward, and separates the waters of the Mediterranean from those of a lagoon named Mar Menor, or Little sea. This lake is about 12 miles in length north and south, 5½ miles in breadth, and its greatest depth is 4¼ fathoms. There are several small islets in its southern part, some of which are of moderate elevation, and it communicates with the Mediterranean by a small shallow mouth at the tower of Encañizada, about 2½ miles north of Estacio point.

Cabezo Gordo, a hill 993 feet high, rises about 4 miles north-westward of the Mar Menor, and terminates nearly in a point, which from La Laja appears isolated. When seen from the north-east it has some resemblance to Grosa island and has been mistaken for it, especially in thick weather, when vessels have run on the beach of La Manga, considering that they were clear of Cape Palos. *See* view facing page.

Plan of Estacio and Grosa island roads on 1458.

Grosa island (*see* views facing page), 5⅓ miles to the northward of Cape Palos is 318 feet high, and 3 cables long in a north and south direction. It lies about 1¼ miles from the coast, and between, there is anchorage, sheltered from easterly winds, in 4½ fathoms water, over weedy bottom, at about 3 cables from the island.

At 4 cables eastward from the north point of Grosa island is El Farallon, a conical rock 72 feet high, between which and the island there is 10 fathoms water.

La Laja (*Lat. 37° 44′ N., Long. 0° 42′ W.*), situated 3½ cables north-eastward from El Farallon, is small in extent, and composed of rock, with 5 feet least water over it, and 11 fathoms between it and El Farallon.

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Plan of Estacio and Grosa island roads on 1458. Var. 13° 10′ W.

Buoy.—A red cylindrical-shaped bell-buoy is moored in 11 fathoms water, at about 60 yards eastward from the edge of La Laja, but this buoy is liable to drift.

Clearing marks.—El Farallon in line with the middle of Grosa island, bearing 245° true, leads to the southward of La Laja, and El Farallon, well open of Grosa island, bearing 210° true, leads to the northward.

Estacio point, nearly 1¼ miles to the northward of Grosa island is low, rocky, and projects about 4½ cables in an easterly direction from La Manga beach. From the point a reef, on which are some rocks above water named Los Escolletes, extends in a southerly direction, a distance of 7 cables, towards Grosa island. There are no inhabitants of the coast between Cape Palos and Estacio point.

LIGHT (*Lat. 37° 45′ N., Long. 0° 43′ W.*).—On the south extreme of Estacio point a yellow conical tower, 51 feet in height, exhibits, at an elevation of 69 feet above the sea, a group *occulting white* light showing a group of *two* eclipses *every ten seconds*, thus: —light, *five and a half seconds;* eclipse, *one and a half seconds;* light, *one and a half seconds;* eclipse, *one and a half seconds*, which is visible in clear weather from a distance of 9 miles.

Anchorage.—Estacio point and the reefs extending to the southward from it, form with the coast a bight which affords anchorage for small vessels, in from 2 to 2¾ fathoms water, over weedy bottom, but in some places there is only about one fathom water.

Directions.—Between Los Escolletes and Grosa island there are depths of from 2 to 4 fathoms, over weedy bottom; and vessels, leaving the road of Torrevieja, with easterly winds, for shelter under Grosa island, use this channel. To clear the above dangers in entering this passage from the northward, when abreast of Estacio point, steer with the west end of Grosa island in line with a small white hillock on the beach of La Manga, near Calnegre point, bearing about 191° true, until at a distance of 2 cables from the island, where there is a depth of 4 fathoms, then round the island, and anchor under its lee as before directed.

Water may be obtained at all seasons of the year by digging wells on La Manga beach.

Chart 1372, Cartagena to Cape San Antonio.

Coast.—At 2½ miles northward of Estacio point, and near Encañizada tower is the entrance to the Mar Menor, having sufficient water for small vessels and fishing boats. Horadada tower lies 5 miles northward of Encañizada tower; and 1½ miles southward of Horadada tower

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

is the coastguard station of Mojon, which is the boundary between the provinces of Murcia and Alicante.

Plan of Torrevieja road on 1458.

TORREVIEJA ROAD is a small bend of the coast, about 20 miles northward of Cape Palos, and Cornuda point, its eastern extreme, is low and rocky, and should not be approached nearer than 2 cables.

LIGHT.—A *fixed red* light is exhibited, at an elevation of 33 feet above the sea, from a dark green iron column, 18 feet in height; the column is situated in a ruined fort on Cornuda point, and the light is visible in clear weather from a distance of 7 miles.

Anchorage. — The bay is generally shallow, but there are from 4½ to 6 fathoms water, over weedy bottom, and good holding ground at half a mile, and 3 fathoms at about a quarter of a mile from the shore. Large vessels anchor at any convenient distance, but as the bay is open to the southward and eastward, they should be prepared to leave, especially in winter, on an easterly or south-easterly wind setting in; the latter is the more severe. Vessels leaving the bay from stress of weather may seek shelter under Grosa island or at Santa Pola.

Town. — The town of Torrevieja, with a population of about 8,000, stands near the coast, and is comparatively modern, and well built; the port is defended by a tower and battery. It derives its importance from the salt works in the vicinity, the principal of which are west of the town, and consist of a lake about 4 feet deep and 3 miles in length, north and south, which communicates with the sea by a channel, whence it is supplied.

Communication.—Railway communication with Alicante, and with Murcia, thence with Madrid; telegraphic communication with all parts.

Life-saving apparatus.—At Torrevieja are stationed a life-boat and rocket apparatus.

Trade.—There is a manufactory of linen, and fishing is actively carried on. The exports consist almost entirely of salt, and the imports are coal, timber, and chemical products.

Shipping. — In 1910, 136 steam vessels, with a total tonnage of 154,232 tons entered the port, and 371 sailing vessels with a total tonnage of 27,681 tons.

Chart 1372, Cartagena to Cape San Antonio.

Coast.—Cape Cervera (*Lat. 38° 0′ N., Long. 0° 39′ W.*) is situated 2 miles north-eastward of Cornuda point, and from it a sandy beach

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

trends northward for about 9 miles, and then turns to the eastward forming Santa Pola bay. The beach is low and backed by hills of moderate elevation.

The town of Guardamar, situated 5 miles northward of Cape Cervera, contains a population of 2,555, and is partly in ruins from the effects of an earthquake; it stands at the foot of a small hill on which are the remains of a castle. The coast between La Mata, 1½ miles northward of Cape Cervera and Guardamar is formed of a series of white sand hills which are seen at some distance seaward; it is clear of danger and may be approached to the distance of a mile, but is exposed to easterly winds. Sierra Callosa, about 12 miles inland, is rugged, of a dark colour, and 1,883 feet above the sea; it is surmounted by a pillar, and is a good distant mark for this part of the coast. *See* view, page 184.

Rio Segura, which enters the sea about a mile northward of the town of Guardamar, is a tolerably large stream, but there is generally little water on the bar, and at times is almost dry, so that not even vessels of very light draught can enter. A sandbank, formed at the mouth of the river extends seaward rather more than a mile.

SANTA POLA BAY, forming an excellent and spacious anchorage, is the principal resort of vessels meeting with strong S.E. and S.W. winds. The bottom has a gradual inclination, the holding ground is good, the water not too deep, and the bay is at all times accessible; large square-rigged sailing vessels winter in the bay.

Light (*Lat. 38° 11′ N., Long. 0° 33′ W.*). — A *fixed green* light is exhibited from an iron column, 16 feet in height, situated at the head of the pier (used for landing cargo), in Santa Pola bay; it is elevated 26 feet above the sea, and is visible in clear weather from a distance of 5 miles.

Anchorage. — The anchorage is in from 4 to 9 fathoms water, over weedy bottom in depths of 4 and 5 fathoms, and farther out over sand in 9 fathoms.

Even from the most exposed quarters (S.E. to S.S.W.) the sea does not reach the anchorage. A vessel from Cape Palos with a strong S.W. wind and a heavy sea, in approaching the bay, will gradually have less wind, until within a convenient depth. The most severe winds are those from the N.W., especially after rain, when a sufficient scope of cable should be given, to prevent dragging from the bank.

The best berth, secure in all seasons, is the anchorage off Tamarit in the north-west angle of the bay, where small vessels have complete

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

shelter from all winds in depths of 3 and 3½ fathoms, and the sea is scarcely felt; but there are patches of shoal water with less than 2 fathoms which should be avoided.

The anchorage, in easterly winds, is in 4 or 5 fathoms water, over weed, about a mile from the shore, with the castle of Santa Pola bearing about 43° true, in which position the gate, in the middle of the west curtain of the castle, will be seen. Large vessels anchor on the same bearing, but farther off-shore in a depth of about 8 fathoms. A vessel may, according to circumstances, especially in summer, anchor nearer the point of the cape, so as to be in a better position for getting under way.

Town.—The castle of Santa Pola encloses within its walls the ancient town, some little distance from the shore, and with the modern town of Santa Pola extending north and west of it, contains a population of 4,356.

Supplies.—Small supplies are furnished from the adjacent towns, and a small quantity of water may be obtained from the town but it is brackish; good water may be procured by digging wells on the beach at Tamarit.

Cape Santa Pola.—The land forming this cape is level, moderately high, projects eastward, and separates the bays of Santa Pola and Alicante. At a distance from the north or south, it appears even and apparently terminating abruptly; but on nearing it, low flat land is seen extending from the foot of the cape eastward, and nearly surrounding it. The cape is of a red colour with broken cliffs, and from the eastward the level plain at its foot is blended with it. *See* view, page 184.

LIGHT (*Lat. 38° 12′ N., Long. 0° 31′* W.).—On Cape Santa Pola, from Talayola tower, square, white, and 47 feet in height, a *fixed white* light is exhibited at an elevation of 498 feet above the sea, which in clear weather is visible from a distance of 10 miles. For arc of visibility, *see* Light list and chart.

TABARCA ISLAND, inhabited by the descendants of Genoese, who formed a colony on Tabarka island on the Tunisian coast, were forced into slavery and subsequently released, lies 2½ miles to the south-eastward of Cape Santa Pola, and is low and level, of an irregular shape, with several small bays indenting the island on its western part; it is one mile in length in an easterly and westerly direction and 3 cables in breadth, the eastern part being the broader and terminating in a projecting point named Falcon.

At the western end of the island are the town of Tabarca and the castle of St. Paul. This part of the land is so low that the fortifications are only 33 feet above the sea; hence the castle is first seen, and then

General charts 2717, 1766, 1, 2158a, 449.

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

the town, both being in a dilapidated condition. The island is nearly surrounded by rocks, many of which are seen above water, outside which, at a cable distance, there are from 4½ to 7 fathoms water. *See* view, page 184.

LIGHT (*Lat. 38° 10′ N., Long. 0° 28′ W.*).—A *fixed* and *flashing white* light *every two minutes* is exhibited from Tabarca island, at an elevation of 90 feet above the sea, and is visible in clear weather from a distance of 15 miles. The tower, 34 feet in height, is square, yellow, has near it a white dwelling, and stands about 620 yards from the east end of the island, and 170 yards from the north coast.

Tunny fishery.—Tunny nets are laid out about three-quarters of a mile south of Tabarca island during the season, 1st February to 30th October. *See* page 73, for Lights, marks, and caution.

Nao islet, the most remarkable of the rocks near Tabarca island, lies 1½ cables off Falcon point, is lower than the island, and surrounded by rocks extending 2 cables in an easterly direction. Between Nao islet and Falcon point there are also several rocks, some of which are uncovered, but the passage is used by fishing boats.

Nao shoal, south-eastward, distant about three-quarters of a mile from Nao islet, is dangerous and rocky, with 2¼ fathoms water over it; El Cabezo, a high mountain inland and eastward of Alicante, open of Picacho de las Matas, a small white peak at the western end of the south front of Cape Huertas, bearing 4° true, leads eastward of Nao shoal. *See* view, page 184.

Midway between this shoal and the ledge of rocks extending eastward from Nao islet, there are 7 fathoms water, which decreases gradually to 4½ fathoms at two boats' lengths from the ledge, and to 4 fathoms close to the shoal, the bottom being weed and gravel.

Tabarca channel. — The channel between Tabarca island and Cape Santa Pola is about 2 miles in breadth, but a shoal, on which the depth is 2¾ fathoms, lies in the fairway with Cape Santa Pola lighthouse bearing 0° true, distant 1½ miles, and narrows the navigable channel, which is on the island side, to less than a mile. The depths are from 3 to 4 fathoms on the mainland side, with a narrow gut of from 5 to 6 fathoms towards the island; the bottom is plainly seen all through the channel.

From the west end of Tabarca island a reef with little water on it extends half a cable to the north-west; and a shoal of sand and weed, with from 13 to 14 feet water on it, fringes Cape Santa Pola at the distance of little more than a cable.

Anchorage.—A vessel off Cape San Antonio, meeting with strong easterly winds, will find Santa Pola bay a convenient anchorage to

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

await a change. When a vessel is unable to reach Alicante in consequence of strong north-west winds, anchorage will be found under Cape Santa Pola, in about 5½ fathoms water, over weedy bottom.

Directions. — With a fair wind and smooth water, vessels of moderate draught may use this passage by keeping rather towards the island side of mid-channel and attending to the lead; but it is by no means advisable that vessels of deep draught should attempt the passage. With south-westerly winds there is generally a swell.

With strong easterly winds the heavy sea which is left outside begins to subside directly a vessel is on the bank, where the water shoals gradually, the bottom being covered with large patches of weed; in the channel the water is smooth, and unless in a vessel of heavy draught, it will be better to use it.

ALICANTE BAY (*Lat. 38° 17′ N., Long. 0° 27′ W.*), 3½ miles deep, is formed between Cape Santa Pola on the south and Cape Huertas on the north, a distance of 10 miles. Midway between the capes the depth is 18 fathoms, shoaling gradually to the shore. Off the Playa del Baver, west of the town, the water is shallow and the bottom mud; and also near the height of Molinet, east of the town. With these exceptions, the shores of the bay are clear of danger, and may be approached at discretion with the lead.

Alicante bay is easily recognised from any direction seaward, before Capes Santa Pola and Huertas are seen, by the hills in the vicinity. Cerro del Molinet and Cerro de San Julian to the eastward terminate in tableland; and 3 miles westward is Cerro de la Font Calent, 2,376 feet high; the town, formed like an amphitheatre, is at the foot of the Cerro del Castillo.

Nearly half a mile to the north-west of the cerro is another hill of less altitude, named El Tosal, on which is the castle of San Fernando. On approaching nearer the bay, the Capes of Santa Pola and Huertas will be seen, and lastly the island of Tabarca. *See* view, page 184.

Plan 469, Port of Alicante.

Outer anchorage. — The usual anchorage in the road of Alicante is exposed from the eastward round to the southward, but, the holding ground being good, vessels ride tolerably easily. In winter the wind shifts to the northward during the night, when it is East or E.S.E. in the day, to which last the road is most exposed. Southerly winds seldom last long; whilst those from North to S.W. are off the land.

A vessel should anchor in 6 or 8 fathoms water, with the castle of Santa Barbara bearing about 350° true, and with good ground tackling will ride through the bad weather of winter. Should it, however, be

General charts 2717, 1766, 1, 2158a, 449.

Plan 469, Port of Alicante. Var. 13° 10′ W.

thought necessary to leave the anchorage, the cable can be buoyed and slipped, and shelter will be found in Santa Pola bay.

In winter the prevailing and strongest wind is from N.W., when vessels often drag their anchors, if too far out. In summer and in winter, when the weather is fine, sea breezes are experienced from E.S.E., which set in at 10 a.m., blow during the day, and are generally succeeded at midnight by the land wind. Sailing vessels generally arrive during the day, and leave with the land wind early in the morning. For wind at Alicante, *see* page 44.

The waves named Las Tascas, which originate in the Gulf of Lyons, break at times in fine weather, and are in the bay of Alicante a sure sign of a northerly wind. *See* page 44.

Depths.—In the outer anchorage 6 to 7 fathoms; inside the Outer breakwater 4¼ to 5 fathoms, but it is to be dredged to 26 to 35 feet; in the entrance to the harbour, 26 feet; in the harbour 20 to 26 feet for about half the area, and a general depth of 26 feet is to be dredged in this portion.

Harbour.—From the beach, at about the middle of the town, a mole projects to the southward and south-westward for a distance of 2,200 feet, and half a mile to the westward another mole leaves the beach, trends eastward for 1,800 feet, and terminates near the former molehead, thus enclosing a space half a mile in length, in a north-easterly and south-westerly direction, and nearly a quarter of a mile in breadth. Outside the East mole an Outer breakwater extends in a southerly direction for 750 yards, and then in a south-westerly direction for a further distance of 400 yards.

The entrance between the moleheads is about 80 yards wide. Vessels load and discharge, moored in tiers alongside the mole; the railway runs along the moles.

Harbour works.—Works are in progress for facing the inside of the Outer breakwater so as to form a vertical quay wall.

LIGHTS (*Lat. 38° 20′ N., Long. 0° 29′ W.*).—On the outer end of Outer breakwater a cylindrical iron tower, on a green tripod, 30 feet high, exhibits, at an elevation of 46 feet above the sea, a *group occulting white* light showing *four* eclipses *every twenty seconds*, thus:—light, *one and four-tenths seconds;* eclipse, *one and four-tenths seconds;* light, *one and four-tenths seconds;* eclipse, *one and four-tenths seconds;* light, *five and eight-tenths seconds;* eclipse, *one and four-tenths seconds;* light, *five and eight-tenths seconds;* eclipse, *one and four-tenths seconds;* it is visible in clear weather from a distance of 12 miles. For arc of visibility, *see* Light list.

A *fixed green* light is exhibited from an iron column, 21 feet in

Plan 469, Port of Alicante. Var. 13° 10′ W.

height, on the East molehead, and a *fixed red* light from an iron column, 19 feet in height, on the West molehead; both are at an elevation of 26 feet above the sea, and both are visible in clear weather from a distance of 5 miles.

Light-buoy.—A buoy exhibiting a *white* light is moored about 45 yards south-westward from the outer end of the Outer breakwater.

City. — The city of Alicante (the Lucentum of the Latins, and Al-Cant of the Arabs) stands at the foot of a conical hill facing the bay. The hill is about 587 feet high, and known as the Cerro del Castillo; it is composed of limestone, steep to the south, and on its summit is the strong castle of Santa Barbara. The city is walled, the streets are narrow, crooked, but well paved and clean, and, including the suburbs, contained at the last census (1910) 51,165 inhabitants, and is highly recommended as a winter resort for invalids. A British Vice-Consul is resident.

Communication. — Nearly all lines of coasting steamers call here, and there is railway communication with Madrid, Valencia, Elche, and Baza; the Madrid railway station is situated on the west side of the town, about half a mile from its centre, the Murcia station near the Playa del Baver, westward of the harbour. A railway is in course of construction from Villajoyosa to Dénia, and this will eventually be continued to Alicante. A steam tramway runs to San Juan and Muchamiel villages, the latter distant 5½ miles. Telegraphic communication with all parts. The telegraph office is always open.

Coal and supplies.—About 4,000 tons of coal are usually kept in stock. Vessels are coaled by lighters holding 10 tons, or alongside the mole, at the rate of from 100 to 500 tons in 24 hours. South and south-easterly winds prevent, or impede, coaling outside the port.

Supplies of fresh meat, vegetables, and bread are not plentiful. Wáter, obtained from artesian wells, is supplied by hose on board; it is fit for drinking, but not very good.

Trade. — The exports, consist principally of wine, almonds, esparto, wine lees, fruit and vegetable preserves, aniseed, and oranges, and the imports of coal, manures, iron staves, wheat, timber, and dried codfish. A tobacco factory employs about 6,000 females.

Shipping.—In 1910, 1,320 steam vessels, with a total tonnage of 1,076,566 tons, entered the port, and 262 sailing vessels, with a total tonnage of 20,437.

Chart 1372, Cartagena to Cape San Antonio.

Cape Huertas (*Lat. 38° 21′ N., Long. 0° 24′ W.*), the northern extreme of Alicante bay, terminates in a low point, but about 100 yards within, rises to a moderate height. The cape is somewhat

General charts 2717, 1766, 1, 2158a, 449.

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

salient to the eastward, and of a whitish colour; the land within is uneven and broken as far as Picacho de las Matas, a small white peak higher than the cape, and which is one of the marks for Nao shoal. *See* page 178.

A reef, with from 2 to 4 fathoms water over it, extends 2 cables in an east-south-easterly direction from Cape Huertas, and continues along the coast to the northward as far as Roqueta, and then commences the Playa de las Huertas.

LIGHT.—From a white circular tower, 27 feet in height, on Cape Huertas, a *fixed white* light is exhibited, at an elevation of 122 feet above the sea, which is visible in clear weather from a distance of 15 miles.

Tunny fishery. — Tunny nets are laid out during the season, 1st February to 30th October, from the shore about a mile westward of Cape Huertas. *See* page 73, for Lights, marks, and caution.

Coast. — Illeta tower, situated $4\frac{3}{4}$ miles to the northward of Cape Huertas, is so named from being built near La Illeta, a small island; the intermediate land is level, and from the offing may be seen the cultivated ground, farms, and other houses.

Anchorages. — Between Cape Huertas and Illeta tower the coast forms a bend, and off it there is good anchorage with north-westerly winds, resorted to by vessels when unable to reach Alicante with strong winds from this quarter; they anchor under the lee of the cape, avoiding the reef before mentioned. A cove, between La Illeta and the shore, affords anchorage, for small vessels, with shelter from easterly winds.

Villajoyosa. — From Illeta the coast trends in a north-easterly direction for 8 miles to the town of Villajoyosa, commonly known as La Villa, which stands upon a small hill a short distance from the beach, and contains about 10,000 inhabitants. The old town occupies the summit of the hill, and the ruins of the ancient walls are still seen; La Marina or suburb of Cristóbal is at the foot of the hill near the beach and fronting the sea.

Villa, a small river, enters the sea to the south-west of the town, and on its western bank is the suburb of Poble nou (Pueblo nuevo). The land in the vicinity of Villajoyosa consists of gardens extending in the interior to the elevated mountain of Aitana to the north, and El Cabezo to the west.

LIGHT (*Lat. 38° 30′ N., Long. 0° 14′ W.*).—A *fixed white* light is exhibited at an elevation of 51 feet above the sea, from a white rectangular tower 40 feet in height, at the north end of the town, and

General charts 1187, 1766, 1, 2158a, 449.

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

30 yards from the sea; it is visible in clear weather from a distance of 10 miles.

Anchorage. — The beach of Villajoyosa is clear of danger, and coasters run on it when they have to make a long stay, but it is entirely exposed to southerly winds. South-west winds, though fresh and frequent, do not send in much sea, and generally fall light at night; but easterly winds are stronger, and cause vessels to leave the anchorage, when they take refuge in Santa Pola bay. At the east end of the beach is a little cove formed by a rocky point, in which there is only a depth of 2 feet.

Supplies.—Fresh provisions may be obtained at moderate prices, and water procured from a well about 80 yards from the sea.

Tunny fishery. — Tunny nets are laid out, during the season, 1st February to 30th October, from Villajoyosa, and from the shore eastward of it. *See* page 73, for Lights, marks, and caution.

Benidorme bay. — Tosal head, a light-coloured promontory, is situated 3¾ miles eastward of Villajoyosa, and with Escaleta point, on which there is a tower, and situated 3 miles further east, forms Benidorme bay, a mile deep: the land around the bay is low with a sandy beach.

The town of Benidorme contains a population of about 3,500, who are principally employed in the tunny and anchovy fisheries.

Benidorme islet (*Lat. 38° 30′ N., Long. 0° 8′ W.*), lying 2 miles southward from the town of Benidorme, is about 2 cables in extent, high, cliffy, barren, and of a red colour. A small shoal, with 3 fathoms water over it, lies about a cable southward of the islet, which is otherwise clear of danger.

Anchorage. — Southerly winds prevail here more than on any other part of the coast, and as they blow on shore, the anchorage is not safe during autumn and winter. The best anchorage, however, is 3 or 4 cables S.S.W. of the town, in from 12 to 15 fathoms water, over weed and muddy sand. From this berth a sailing vessel will clear Escaleta point, in the event of a S.W. wind setting in. Small vessels generally anchor under the cliff on which the town stands, on the west side, with a cable to the shore and an anchor to the south-west. Coasters, intending to remain any time, run on the beach.

Tunny fishery. — Tunny nets are laid about a mile eastward of the town during the season, 1st February to 30th October. *See* page 73, for Lights, marks, and caution.

Water.—Water may be obtained from a fountain near the beach.

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Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

Sierra Helada (Peñas de Arabi). — Between Escaleta point and Albir point, 3 miles to the north-east, the land is elevated and remarkable, known as the Sierra Helada, and to navigators as the Peñas de Arabi. Facing the sea it is of red, inaccessible cliffs, but on the land side slopes gradually to a low plain; hence, when seen from the north-east or north-west, it has the appearance of a wedge with its thick or vertical end towards the sea.

With a commanding breeze the Peñas de Arabi may be approached to a convenient distance, as the shore is bold; but with easterly winds sailing vessels should not go too near, as it may become calm under the high land; nor with N.W. winds on account of the heavy squalls and eddies which blow over it. To the north-eastward of Escaleta point at 1¼ and 2½ miles, respectively, are Mitjana and Pila islets, small and lying close to the coast.

Tunny fishery. — Tunny nets are laid out during the season, 1st February to 30th October, in the neighbourhood of Albir point. *See* page 73, for Lights, marks, and caution.

Cuchillada de Roldan.—To the north-westward of the middle of the Sierra Helada, and 5 miles inland, rises Puig Campana, 4,710 feet high, between the southern ridges of which and the slope of the Sierra Helada is an extensive plain, causing the latter at a distance to appear like an island.

Puig Campana is the most remarkable mountain on the whole of this part of the coast, being isolated, and having on its summit, on the western part, a deep cut or gap, which from the south-eastward appears artificial, and from its great elevation is seen at a long distance, forming a most excellent mark, known as La Cuchillada de Roldan, or the cut of Roldan. (*See* view facing page.) When Benidorme island is in line with it, the cut is well open and bears about 328° true.

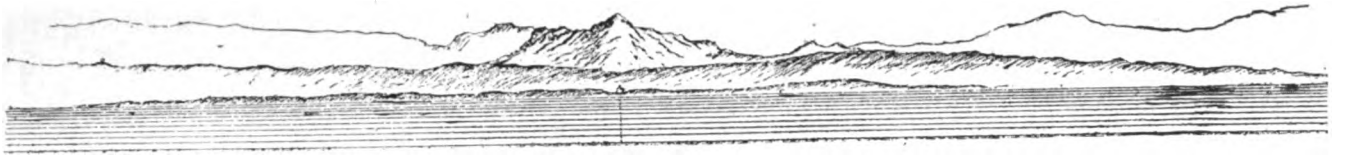
Altea bay, formed between Albir point to the south-westward, and Cape Toix to the north-eastward, is 5 miles wide and 2 miles deep, and affords anchorage for all classes of vessels, sheltered from N.E., round by north, to S.W. The bay is easily entered even by night, and its position from seaward is indicated by the Cuchillada de Roldan, already mentioned.

LIGHT (*Lat. 38° 34′ N., Long. 0° 3′ W.*).—On Albir point, and about 11 yards from the coast, a white circular tower, 26 feet in height, exhibits at an elevation of 367 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 11 miles.

Anchorage. — Large vessels anchor south-eastward of the town of Altea, in from 10 to 13 fathoms water, over sand and mud, about a

General charts 1187, 1766, 1, 2158a, 449.

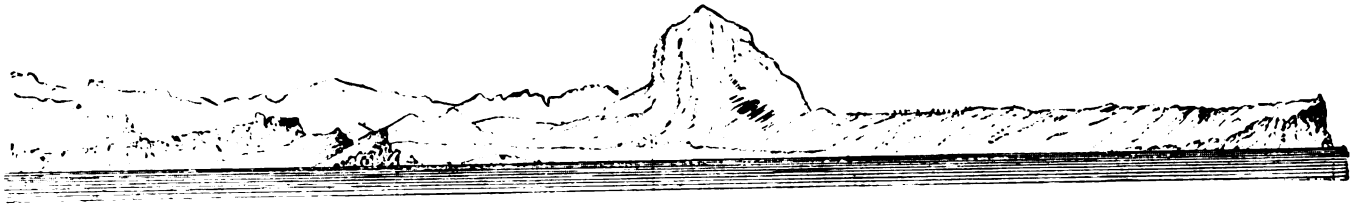
To face page 184.]



Sierra Callosa, bearing 335° true, distant 30 miles.

Sierra Jijona. *Cape Santa Pola.* *Cerro del Castillo. Alicante bay.* *Cerro de S. Julian.* *El Cabezo, distant 30 miles.* *Tabarca island lighthouse, bearing 15° true, distant 8 miles.*

Sierra Aitana. *Cuchillada de Roldan, Puig Campana. bearing 347° true, distant 12 miles.* *Benidorme islet.*



Cape San Martin. *Monte Mongo, bearing 294° true.* *Cape San Antonio lighthouse, bearing 309° true, distant 5 miles.*

Chart 1372, Cartagena to Cape San Antonio. Var. 13° 10′ W.

mile from the nearest coast. In this position a sailing vessel would be unable to clear Albir point, in the event of south-easterly wind, but as these winds generally set in from northward and eastward, the anchorage should be quitted before the wind shifts to the south-eastward. The best berth, with south-westerly winds, is in depths of from 4 to 6 fathoms in the southern part of the bay, which is much frequented by lateen rigged vessels during southerly winds.

Town.—The town of Altea, nearly in the middle of the bay, stands at the foot of a small hill, on which there is a modern hermitage or chapel near the coast. It has a population of about 6,000. Raisins, oranges, lemons, and carobs are exported.

Supplies of fresh provisions may be obtained, and about half a mile north-east of the town the Rio Algar enters the sea, discharging abundance of water in winter, but rather scanty in summer. Its waters are as clear as crystal, and afford a ready supply to vessels visiting this bay.

Plan of Calpe anchorages on 1187.

Calpe anchorages.—Cape Toix, the north-east extreme of Altea bay, is also the west extreme of Calpe West anchorage. Monte Ifach, or the Peñon de Calpe, being the eastern extreme. This bay is 2¾ miles wide, more than a mile deep, and open to the southward. Calpe East anchorage lies on the northern side of Monte Ifach.

The town of Calpe stands on a small hill in the middle of the West anchorage about a quarter of a mile from the coast, contains a population of about 2,000, and exports dried fruits.

Supplies.—Some fresh provisions may be procured, but no water.

Tunny fishery.—Tunny nets are laid out, during the season, 1st February to 30th October, in Calpe West anchorage, and extend about 4 cables westward of Macho point. *See* page 73, for Lights, marks, and caution.

Anchorage.—Small vessels may anchor in the West anchorage under favourable circumstances, in 6½ fathoms water, over sand and weed, south-eastward of the town, and a third of a mile from the shore. During strong north-easterly or easterly winds, heavy squalls and eddies blow down from the mount.

Vessels may anchor in the East anchorage in 14 or 15 fathoms water, about half a mile from the shore.

Monte Ifach (*Lat. 38° 38′ N., Long. 0° 4′ E.*), an extensive mass of high rocky land, 1,076 feet high, and terminating in peaks, is of a red colour, and connected to the mainland by a low, sandy neck which gives it the appearance of an island when seen from north-east

Plan of Calpe anchorages on 1187. Var. 13° 10′ W.

or south-west. The mount is bold on all sides, and it is locally said to resemble a ship with her stern to the shore. The outer extreme of the mount is named Ifach point, and nearly one mile northward of it is La Fosa, a small cove with 1½ to 2 fathoms water in it.

Water.—At a short distance from the tower of La Cala is a well, affording an abundant supply of good water.

CAUTION. — Sailing vessels, too near the coast with off-shore winds, are liable to heavy squalls and eddies, which blow down from Monte Ifach, and should therefore be cautious in passing under its lee or that of any other high land.

Plan of Morayra bay on 1187.

Morayra bay is situated 4 miles eastward of Ifach point, between Cape Blanco to the westward and Cape Morayra to the eastward: it is 1⅔ miles wide and two-thirds of a mile deep, the shore being rocky with patch of beach. The town of Tuelada, with a population of about 3,000, stands on a hill about 3 miles to the northward of the fort. Cape Morayra, the eastern end of the bay, is high, with a tower on it.

Anchorage. — Vessels may obtain anchorage, sheltered from northerly winds, in from 9 to 15 fathoms water, over sand and mud; the best berth is in a depth of 10 fathoms, over sand and ooze, about 3 cables southward of the ruins of Morayra castle, on the north side of the bay.

Chart 1372, Cartagena to Cape San Antonio.

Cape Nao, high and rugged, is 5 miles north-eastward of Cape Morayra, and the coast, precipitous and broken, thence trends northward for 2 miles to Cape San Martin, which has a small peak at its extremity, and is not so high as the preceding coast. (*See* view, page 184.) About one mile westward of Cape Nao is Descubridor islet, about 2 cables in extent and 187 feet high, and on the south side of Cape San Martin, and near the coast is Portichol islet, 223 feet high, fringed with rocks on its western side, but on the eastern and southern sides clear of danger.

Plan of Javea bay on 1187.

JAVEA BAY (*Lat. 38° 48′ N., Long. 0° 12′ E.*), to the northward of Cape San Martin and between it and Cape San Antonio, a distance of 2½ miles, is spacious and more than a mile deep; in the northern part of it are the ruins of Fuerte San Jorge, the Custom-house and marine store houses; a little west of these buildings the Rio Jalon or Gorgós runs into the sea through the middle of a small sandy beach. Nearly the whole shore of Javea bay is rocky and bold, except

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Plan of Javea bay on 1187. Var. 13° 10′ W.

a small reef extending from Fontana point, which is nearly in the middle of the bay, and on which are the remains of a fort.

Cape San Antonio (Dianium Promontorium of the Romans), high, level, and projecting eastwards, is perpendicular towards the sea, has several windmills on it, and a light-tower on its extremity; it is clear of danger, and vessels may pass it at a prudent distance. *See* view, page 184.

It frequently happens that sailing vessels from the south-westward with the wind from that quarter, when off Cape San Antonio meet with strong northerly or north-easterly winds. In such cases large vessels generally work to windward, between the cape and Iviza, but make little progress in consequence of the adverse current and sea. A vessel may, however, anchor in Morayra or Javea bay and await a change, or take advantage of the land breeze in the morning.

LIGHT (*Lat. 38° 49′ N., Long. 0° 12′ E.*). — On the extreme of Cape San Antonio, from a white circular tower, 14 feet high, and having a dark green lantern, is exhibited at an elevation of 571 feet above the sea a *fixed* and *flashing white* light *every thirty seconds*. The *fixed* light is visible in clear weather from a distance of 16 miles, the *flashing* from 30 miles, and through an arc of 240°.

Signal station. — There is a signal station and semaphore at Cape San Antonio. *See* page 67.

Anchorage.—The northern part of the bay is the only portion free from rock, and the anchorage is in 13 fathoms water, over sand, about a mile eastward of the fort, with Cape San Antonio lighthouse bearing about 343° true, distant 6 cables, but this is very close to the telegraph cable. Small vessels anchor closer in and at 2 cables from the rocks there are 7½ fathoms water. During summer, vessels for cargoes anchor in El Rincon, between the Custom-house and Palmera point, about a cable from the shore.

Telegraph cables. — Two telegraph cables are laid between Javea bay and Iviza island, the cable-house being situated on the south side of the entrance to the Rio Jalon, from which they take an easterly and south-easterly direction into 9 fathoms water; as they skirt the southern limit of the anchorage closely, vessels should not anchor in the vicinity. The telegraph office is always open.

Buoys.—Two buoys mark the cables, the outer in 9 fathoms water, and the inner in 7 fathoms, distant 4 and 2 cables, respectively, from the cable-house.

Town. — The town of Javea, with a population of about 8,000, is on the left bank of the Jalon, about half a mile from the ruins of the fort; it is surrounded by a wall with a suburb outside it. About

Plan of Javea bay on 1187. Var. 13° 10′ W.

250 vessels visit the bay annually. The exports are raisins, almonds, oranges, and wine.

Supplies. — Some fresh provisions may be procured and water obtained from wells.

Life-saving apparatus.—A lifeboat and rocket apparatus are maintained at Javea.

Chart 1320, Cape San Antonio to Cape Tortosa.

BAY OF VALENCIA.—Between Cape San Antonio and Cape Oropesa, distant 78 miles, the coast forms a bay or bight 25 miles deep, and with the exception of Cape Cullera it is everywhere low, with a sandy beach, it is much exposed to easterly winds, which are frequent.

Easterly gales blow hard, cause strong currents, and are accompanied by dark gloomy weather, which obscures the land, and sailing vessels should avoid this part of the coast as much as possible during the winter.

Depths off-shore. — At 10 miles from the coast there are from 30 to 50 fathoms water, diminishing gradually to from 15 to 25 fathoms at the distance of 5 miles.

Winds.—*See* page 44.

Monte Mongo (*see* view, page 184).—From Cape San Antonio a chain of mountains extend westward, the highest part of which, named Monte Mongo, rises near Dénia. It is conical shaped, and the summit, on which there is a pillar, 2,496 feet high, forms an excellent mark, and with north-westerly winds might be seen from a distance of 50 miles appearing like an island; but with easterly or north-easterly winds it becomes obscured, and is scarcely visible from distances of 8 or 10 miles.

With north-easterly and easterly winds the sea beats heavily on this part of the coast; and as heavy squalls and eddies occur under the high land with south-westerly winds, it should not be approached too closely. Several vessels have been wrecked here.

Plan of Port Dénia on 1458.

PORT DÉNIA (*Lat. 38° 50′ N., Long. 0° 7′ E.*), an artificial port, about 8 cables long by 3 cables wide, lies about 4½ miles westward of Cape San Antonio.

The harbour consists of a northern and southern breakwater; the former curves to the south-eastward for about 1,200 yards from Rasel point. The southern breakwater, commencing about 9 cables south-eastward of Rasel point, has a north-easterly direction for about 375 yards, and then turn to the northward for about 575 yards. From the extremity of each breakwater a pier will extend north-eastward for a distance of about 650 yards, and the entrance between these parallel piers will be a cable in width.

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Plan of Port Dénia on 1458. Var. 13° 10′ W.

In 1912 the extension works were limited to the gradual prolongation of the southern pier, which in that year had reached the length necessary to protect vessels in the port; in that year there was room inside the harbour for about seven vessels from 200 to 250 feet in length and drawing less than 14 to 17 feet. It is proposed to dredge the harbour and construct piers, but the execution of these works is indefinite.

Depths. — There are depths of 8 to 17 feet inside the harbour; 9 feet to 9 fathoms on the leading line through the entrance; and 5 to 10 fathoms in the outer anchorage.

LIGHTS (*Lat. 38° 50′ N., Long. 0° 7′ E.*). — A *fixed green* light is exhibited, from a lamp-post, at an elevation of 13 feet above the sea, at the completed extremity of the northern breakwater; it is visible in clear weather from a distance of 2 miles. A *fixed white* light is exhibited on an iron post at an elevation of 13 feet above the level of the sea, at the completed extremity of the southern breakwater.

Two *fixed red* leading lights are exhibited in the interior of the port, opposite the entrance channel; the front light is on a stone plinth in the sea, 75 yards from the shore, and 33 feet above the sea; the rear light is on a hut 90 yards from the shore, 33 feet above the ground and 47 feet above the sea. The lights in line, bearing 48° true, lead between Bajo el Caballo and Bajo la Androna, but over the northern point of Bajo el Blancar; they are visible in clear weather from a distance of 7 miles. For arc of visibility, *see* Light list.

Outer anchorage. — During summer, with south-westerly winds, vessels may anchor outside the shoals in 10 fathoms water, over sand, in Fuera anchorage. Before dropping the anchor, the nature of the bottom should be ascertained, for in some places it is rock. This anchorage is much exposed, and it often happens in the month of November and December, or when the wind blows from the north-eastward that vessels are obliged to slip their cables and seek shelter under the lee of Cape St. Antonio or Cape St. Martin.

Between the town of Dénia, which is about a third of a mile from the coast, and the shore, is the convent of San Francisco, with a remarkable tower, and within the town of Dénia is a church, the belfry of which, being the only one, cannot be mistaken.

Pilots. — CAUTION. — Pilots may be procured, and as the depth and width of the channel into Port Dénia varies from day to day it should never be entered without a pilot.

Town. — The town of Dénia (the Dianium of the Romans, and Dania of the Arabs) stands on the north slope of Monte Mongo, at a third of a mile from the sea. It is a walled town, and contained, with the Arrabal de la Marina (suburb to the S.E.), in the year 1910, a population of 12,500. Between the town and suburb is a small hill,

Plan of Port Dénia on 1458. Var. 13° 10′ W.

on which is the castle, conspicuous from seaward, and on its north slope are the remains of the temple of Diana of the Ephesians, from which the town derives its name.

There is telephonic communication throughout the town, and to the principal country residences around it. A British Vice-Consul is resident.

Communication.—Railway communication with Gandia and the main line between Valencia and Madrid; a line is also being constructed to Villajoyosa, and will be completed in 1913; telegraphic communication with all parts.

Supplies.—There are but few resources at Dénia; good water in small quantities can be procured from the city fountain, as also at some wells in the suburbs.

Pier (*Lat. 38° 50′ N., Long. 0° 7′ E.*).—There is a pier for landing and embarking cargo southward of the leading lights, with depths of 9 to 13 feet at its outer end.

Life-saving apparatus.—A lifeboat and rocket apparatus are maintained at Dénia.

Trade.—The exports, consisting chiefly of raisins, oranges, onions, grapes, and almonds, in the year 1910, had an aggregate value of £490,125. The imports, principally coal and lumber, amounted in the same year to £15,200.

Shipping.—In 1910, 194 steam vessels, with a total tonnage of 154,353 tons, entered the port, and 9 sailing vessels, with a total tonnage of 1,671 tons.

Chart 1320, Cape San Antonio to Cape Tortosa.

Rio Bullent.—About 8 miles to the north-west of Dénia is the entrance of Rio Bullent or Calapatar, which small vessels can enter, and which is navigable by boats for some distance. Oliva, having a population of about 9,000, stands at the foot of a small hill 1½ miles from the sea, about 2½ miles northward of Rio Bullent, and is conspicuous.

Plan of Port Gandia on 1320.

PORT GANDIA, at the entrance of the Rio San Nicolas, consists of a north breakwater extending in an easterly direction from the shore for a distance of about 700 yards and a south breakwater extending in a north-easterly direction from the shore, a distance of about 380 yards; the entrance to the harbour is 130 yards in width.

A wharf for unloading coal was under construction in 1911.

A breakwater has been constructed to prevent a sandbank from forming off the entrance to the port. It projects from the south mole

Plan of Port Gandia on 1320. Var. 13° 20′ W.

at a distance of 200 yards from its extremity, and curves to the south-eastward for a distance of 350 yards.

Depths. — There is 16 feet of water at the entrance to the harbour, and from 3¼ to 3¾ fathoms within the port. There is a depth of 19 feet alongside the wharf on the south side of the harbour.

LIGHT (*Lat. 39° 0′ N., Long. 0° 9′ W.*). — A *fixed red* light, elevated 42 feet above the sea, and visible in clear weather from a distance of about 7 miles, is exhibited from near the outer extreme of the north breakwater.

A *fixed green* light is shown from the head of the south mole, which is visible from a distance of 2 miles, but it is not seen bearing less than 272° true.

Gandia. — The town of Gandia, with, in 1910, a population of about 10,000, stands in a beautiful and fruitful plain on the left bank of the Rio Alcoy, about 2 miles from the sea. The town is lit by electricity. The temperature is said to be agreeable all the year round; there are only two months of cold and two months of hot weather. A British Vice-Consul is resident at Gandia.

Communication.—Gandia has communication by railway with Alcoy, Valencia, Barcelona, Madrid, and other places in Spain; also with Paris. It has also telegraphic communication with all the principal towns in Spain.

Coal. — About 300 tons of coal are kept in stock, and vessels must come alongside the quay to coal.

Trade. — The exports, consisting chiefly of oranges, tomatoes, onions, and raisins, valued in the year 1910 at £418,448, and the exports, coal, timber, and fertilisers, at £87,958.

Shipping. — In 1910, 192 steam vessels, with a total tonnage of 150,123 tons, entered the port, and 71 sailing vessels, with a total tonnage of 3,694 tons.

Chart 1320, Cape San Antonio to Cape Tortosa.

Rio Júcar (ancient Sucro) flows into the sea about 10 miles north of Port Gandia, and small vessels can cross the bars at its mouth, but large vessels anchor off the river during off-shore winds; there is a tower on the south point.

Plan of Cullera anchorage on 1458.

Cullera anchorage lies between the mouth of the Rio Júcar and Pensamientos point; the 3-fathoms bank extends nearly as far out as a line between these two points. Vessels anchor in 3½ fathoms about 4 cables northward of El Moro.

El Moro, a rock above water, lying about 7 cables north-eastward of the mouth of the Rio Júcar, and half a mile from the shore, has

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Plan of Cullera anchorage on 1458. Var. 13° 20′ W.

from 3 to 5 fathoms water around it, and 3 to 3½ fathoms, over sandy bottom, between it and the shore.

Beacon.—El Moro is marked by a red beacon 18 feet in height.

Cape Cullera.—From the mouth of the Rio Júcar the low sandy coast forms a bend as far as Negra point, which is rocky. Thence it rises to the high land of Cullera, which extends seaward in an easterly direction, terminating in a double point named Cape Cullera; a tower stands on its south side, 148 feet above the sea. On the south side of the cape is Pensamientos point, joined to the shore by a sandy neck.

LIGHT (*Lat. 39° 11′ N., Long. 0° 13′ W.*).—On the extremity of Cape Cullera a yellow circular tower, 44 feet in height, exhibits, at an elevation of 91 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 15 miles. For arc of visibility, *see* Light list.

Town.—The fortified town of Cullera, with about 12,000 inhabitants, stands on the left bank of the Júcar at about a mile from the entrance, and at the foot of the Cullera hills.

Communication.—Railway communication with the main line between Valencia and Madrid viâ Silla; telegraphic communication with all parts.

Supplies of fresh provisions and water may be obtained.

Trade.—There are no exports, and the imports, consisting of sulphate of ammonia and super-phosphate, amounted in 1910 to £108,360.

Shipping.—In 1910, 56 steam vessels, with a total tonnage of 31,291 tons, entered the port, and 3 sailing vessels, with a total tonnage of 130 tons.

Chart 1320.

Albufera de Valencia is a lake about 7 miles in length, separated from the sea by a narrow strip of low, sandy land; its south end is about 6 miles northward of Cape Cullera. It is from 5 to 11 feet deep, supplied by numerous small streams, and has two outlets that named El Perelló at its south-east end and El Perellonet, 2 miles further north, which both open and become choked again every year with the sand washed up by the sea. Near these outlets there are some fishermen's huts, and on the banks of the lake, several villages.

About 2½ miles westward of Casa del Rey, Santos del Sueca, 125 feet above the level of the sea, and surmounted by a hermitage, rises abruptly from the plain and is conspicuous.

General charts 1187, 1, 2158a, 449.

Chart 1320, Cape San Antonio to Cape Tortosa. Var. 13° 20′ W.

Beacon. — A wooden beacon, Cruz del Moro, composed of beams painted red and white, stands on the coast about half a mile northward of Casa del Rey.

Plan 562, Port of Valencia.

VALENCIA. — The city of Valencia stands in a wide plain, named El Huerta, about 17 miles northward of Cullera, and on the right bank of the Rio Túria, 2 miles west-north-west of the Grao, or strand. It is enclosed by walls and surrounded by villas and gardens, which give it a pleasant appearance from seaward. A British Consul is resident.

With the exception of the Gothic town hall and a few Moorish remains, there are few objects of interest. The city, with its suburbs, contained by the census of 1900 a population of 213,530.

It is connected with the suburbs on the opposite bank of the Túria by five bridges; thence the river flows into the sea a little south of the Grao; after rains its waters are muddy. There is but little water on the bar, but small vessels cross it.

Landmarks.—Valencia cathedral has a white octagonal central dome, Del Miguelete, 197 feet high, with a short octagonal tower, marked by a broad white band, northward of it, and is the highest building in the city.

The church northward of Grao, Ermita del Rosario, has a high oblong tower, with flat roof.

A water tank, supported on an open trellis-work tripod, forms a conspicuous object near the mouth of the Rio Túria.

The Port of Grao (*Lat. 39° 27′ N., Long. 0° 19′ W.*), of Valencia, derives its name from Villanueva del Grao, a town with 5,216 inhabitants, situated near the beach, and about 2 miles from the city of Valencia. A little north of Villanueva del Grao is Pueblo Nuevo del Mar, commonly known as Cabañal, having a population of 11,290, a large portion of which are fishermen. It stands a short distance from the beach, where fishing vessels are hauled up.

The harbour is formed between two moles; the Dique de la Providencia, or eastern mole, extends straight and nearly in a south-easterly direction for about 1,400 yards, with an arm curving outwards, 260 yards in length, from which it extends eastward 650 yards, and then south-eastward for a further distance of about 590 yards. The extension is named Dique del Norte.

The Dique de Poniente, or western mole, trends from the shore in a south-easterly direction for nearly 800 yards, having at its head an Astronomical pillar; the channel between this molehead and Dique de la Providencia is nearly 400 yards in width. From the south side of

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Plan 562, Port of Valencia. Var. 13° 20′ W.

the Dique de Poniente and crossing the mouth of the Rio Túria a breakwater, named Malecon del Turia, extends southward for about 1,400 yards, and then another mole, Dique del Sur, which is still under construction, will when completed extend eastward for a further distance of 1,200 yards.

About a cable south-eastward of the extreme of Dique del Sur, will be the western head of a detached breakwater, Dique del Est, which, when completed, will extend about 230 yards eastward and then north-eastward for a distance of 700 yards, leaving between its north head and the extreme of Dique del Norte, an entrance about 2 cables in width. This outer breakwater was commenced in 1913.

The inner portion of the port is further protected by cross moles, 270 yards long from both moles, leaving a narrow entrance about 260 feet wide between the heads.

Vessels are generally secured at a right angle to the mole using anchors and stern hawsers; there are strong bollards everywhere for securing hawsers.

The Outer port is that portion of the harbour south of Dique del Norte. Basin No. 1 is between Malecon del Turia and Dique del Sur. Basin No. 2 is between Dique de Poniente and Dique de la Providencia outside the cross moles. Basin No. 3 is the innermost harbour.

Depths. — The depth in the Outer port is from 26 to 50 feet. Basin No. 1 from 12 to 27 feet, but this is liable to become less on account of the silt from the Rio Túria.

Basin No. 2 has a depth of 28½ feet throughout the greater part, Basin No. 3 has an average depth of 25½ feet, and the channel leading to the inner harbours has a depth of 28 to 30 feet. Dredging operations are in progress.

The quays are all connected with the railway system, and are well lighted by electricity.

LIGHTS (*Lat. 39° 27′ N., Long. 0° 19′ W.*). — From a white iron tower, 60 feet high, erected near the outer extremity of Dique de la Providencia, is exhibited, at an elevation of 82 feet, and visible from a distance of 15 miles, a *group flashing white* light *every twenty seconds*, showing thus:—*four* flashes, occupying *seven seconds:* eclipse, *six seconds;* flash, *one second;* eclipse, *six seconds.*

A *fixed green* light is shown from the angle of Dique de la Providencia, to the westward of the preceding light. Vessels should not pass within a quarter of a cable of this light.

The entrance to Basin No. 3 is marked by a *green fixed* light on the east side and a *red fixed* light on the west side.

A *red fixed* light is shown from the Astronomical pillar.

Cabañal.—A *fixed white* light is shown at an elevation of 66 feet above the sea, from a white square tower, 54 feet in height, and

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Plan 562, Port of Valencia. Var. 13° 20′ W.

situated at the tower of the Hermitage (Iglesia de los Angeles), and is visible in clear weather from a distance of 10 miles.

Light-buoys.—A red conical buoy, showing a *fixed green* light, is moored at the extreme of the Dique del Norte, and a similar one inside the same mole, at a distance of $1\frac{3}{10}$ cables, 135° true, from the *group flashing* light on Dique de la Providencia.

A black can buoy, showing a *fixed red* light, is moored at the northern extreme of the Dique del Est now constructing.

Buoys.—A black conical buoy marks the eastern extreme of the works on Dique del Sur, and a similar buoy the south-western angle of Dique del Est.

Pilots may be obtained by making the usual signal.

Plan of Outer anchorage on 1320 and 562.

Anchorage (*Lat. 39° 27′ N., Long. 0° 19′ W.*).—In the roadstead the best anchorage is in about 7 fathoms water, over mud bottom, about half a mile to the north-eastward of the Geodetic pillar on the East mole, with the tower of the cathedral seen a little southward of Iglesia de Grao. Care should be taken not to anchor northward of the line of the cathedral and the church, Ermita del Rosario, northward of Grao in line, in order to avoid the stony bank, Algar del Cabañal, with $5\frac{1}{2}$ to 8 fathoms water on it, which extends northward one mile, and is 8 cables wide.

The roadstead of Valencia is unsafe during winter when south-east winds blow, but as these winds set in from the north-east and remain in that direction for about 24 hours, vessels should leave the roadstead and gain an offing before it shifts more easterly or southerly. During summer the sea breeze sets in from the eastward about 10 a.m., shifts to the south-east, becomes fresh at south-west about noon, and following the course of the sun, dies away at sunset, being succeeded by the land wind at night; but even in this season it is common for three or four days to pass without being able to communicate with the shore; but with off-shore winds the sea is smooth. For winds at Valencia, *see* page 45.

The waves named Las Tascas originating in the Gulf of Lyons break at times in fine weather, and are in the Bay of Valencia a sure sign of an easterly wind. The collection of Cumulas clouds over Cape Oropesa are also a sign of an easterly wind. *See* page 44.

Directions.—With the wind at east a sailing vessel bound for Valencia should enter the bay by passing to the southward of Formentera and through the channel separating Majorca and Iviza, in order to avoid the adverse set of the current, which, during such winds, would be found running between Cape San Antonio and Iviza. By thus approaching it from the northward, the on-shore stream, which is strongest off the land abreast of Gandia, is avoided. It is frequently the case that a sailing vessel on arriving off Cape San Antonio

Plan 562, Port of Valencia. Var. 13° 20′ W.

with the wind at S.W. meets a wind from North or N.E.; she must then wait for the land breeze for doubling the cape.

Sailing vessels making the port for shelter with the wind from N.N.E., or under the worst conditions, should remember that, notwithstanding the wind blowing parallel to the coast, the swell is generally from E.N.E. or nearly across the mouth of the port, and the ebb stream running out has to be met. In such circumstances, immediately the port is sighted, bear away as much as possible so as to bring the swell astern, and make the Outer port, where shelter from the wind and sea will be found, and assistance to enter the Basins can be procured.

Tidal streams.—The tidal streams are said to run about 6 hours each way at rates of from half a knot to 1½ knots an hour.

Communication.—Twelve steamship companies have vessels calling frequently at Grao.

Valencia has railway communication with Madrid and Barcelona and with Calatayud on the line between Madrid and Saragossa, also locally with Liria, Betara, Rafelbunal, Utial, and Alberique; the principal railway station (Estacion del Norte) is in the south-east district and about a mile from the centre of the city; the Madrid, Barcelona, and Alicante trains run into this station, also the trains from Grao. Tramways through the principal streets and round the city, also to Burjasot.

Telegraphic communication with all parts. The telegraph office is always open.

Coal.—About 12,000 tons of coal, and 4,000 tons of patent fuel, are usually kept in stock. Vessels are coaled by baskets; about 500 tons can be put on board in 24 hours, or 750 tons with two days' notice; there are 18 tugs and any quantity of lighters available, but coaling in the outer anchorage may be prevented or impeded by winds between north and south-east.

Supplies.—Fresh provisions and other supplies can be obtained either at the port or at the city. Drinking and boiler water, from artesian wells, may be obtained in a tank vessel, but the boiler water is unfit for small water-tube boilers without filtering.

Repairs.—Large repairs to machinery can be effected.

Trade.—Valencia is an extremely important fruit-producing and exporting centre, the total value of fruit, oranges, onions, melons, and tomatoes exported to the United Kingdom in 1910 was £361,875; the total value of the imports in the same year, principally coal, patent fuel, chemical manures, and cod fish, was £90,920.

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Plan 562, Port of Valencia. Var. 13° 20′ W.

Shipping.—In 1910, 2,961 steam vessels entered the port with a total tonnage of 2,384,034 tons, and 520 sailing vessels with a total tonnage of 32,848 tons.

Quarantine. — Grao is a first-class sanitary station, and here vessels can have hull and cargo disinfected and rats destroyed. *See* also page 9.

Life-saving apparatus. — A lifeboat and rocket apparatus is maintained in the harbour, and a rocket apparatus near the Lazareto on the south side of the mouth of the Rio Túria.

Plan of Porto Sagunto on 1320.

Porto Sagunto lies about 13 miles northward of Puerto del Grao.

Harbour.—The artificial harbour consists of a breakwater extending 2,160 feet in an easterly direction and a perpendicular steel pier 735 feet long. On the western part of the breakwater is a berthing quay of 1,016 feet, from which iron ore is loaded by means of iron structures, on which railway trucks ascend by the aid of powerful electric lifts; there are also six electric and steam cranes on the berthing quay. By means of these appliances from 5,000 to 6,000 tons can be loaded and 750 tons discharged in 10 working hours, and these quantities can be easily doubled in a full day, as the quay is well supplied with modern electric light appliances. In 1907, 150,000 tons of ore was shipped; in 1911 it was hoped to ship 750,000 tons. In 1911 the perpendicular pier (735 feet) was still under construction, and also another pier, 400 feet long; more appliances for loading vessels will be fitted on these piers when they are completed.

Depth.—The depth in the port, over a space of 39 acres, is 30 feet; this gives sufficient room to manœuvre steam vessels with ease. Dredging is in progress to increase this area.

Light (*Lat. 39° 39′ N., Long. 0° 13′ W.*). — The end of the breakwater is marked by a *fixed white* light, exhibited from a white wooden post, with a red and green top, 41 feet high, and visible from a distance of 5 miles.

Town. — The town of Murviedro or Sagunto (ancient Saguntum) on the right bank of the small Rio Palancia, stands on the slope of a small hill, the summit of which, being occupied by the castle, is an excellent mark for vessels bound to Valencia from the north-eastward; it contains a population of 6,800.

Communication.—There is railway and telegraphic communication at Murviedro, and a railway connects Sagunto with the mining district, a distance of 130 miles.

Coal.—Supplies.—Coal may be obtained, also water and stores, at reasonable prices.

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Plan of Porto Sagunto on 1320. Var. 13° 20′ W.

Anchorage. — The outer anchorage, being exposed to easterly winds, is little frequented.

Chart 1320, Cape San Antonio to Cape Tortosa.

Canet point, on the northern bank of the Rio Sagunto, lies about one mile northward of Porto Sagunto.

The boundary between the provinces of Valencia and Castellon is 3 miles north-north-eastward of Canet point.

LIGHT (*Lat. 39° 40′ N., Long. 0° 12′ W.*). — A yellow stone tower, about 100 feet in height, the lower part octagonal and upper part in the form of a truncated cone, surmounted by a white cupola, is situated on Canet point, and exhibits, at an elevation of 110 feet above the sea, a *group flashing white* light showing groups of *two flashes every ten seconds*, thus:—flash, *two-tenths of a second;* eclipse, *two and eight-tenths seconds;* flash, *two-tenths of a second;* eclipse, *six and eight-tenths seconds;* it is visible in clear weather from a distance of 16 miles.

Plan of Burriana road on 1571.

Burriana, a town with 15,200 inhabitants, is situated about 14 miles northward of Canet point on the right bank of the Rio Seco, or Bechi, about 16 miles north-eastward of Murviedro and 2 miles from its port, with which it is connected by a tramway line; orange-growing forms the principal industry, carobs and barley are also exported. It is well supplied with good water for drinking purposes. A British Vice-Consul is resident. It is proposed to construct a small artificial port here, but in 1912 it was still in abeyance.

LIGHT. — On the beach on the southern point of the river entrance at Burriana a *white group occulting* light is exhibited, at an elevation of 29 feet above the sea, from a green iron column, 23 feet in height, and surmounting a yellow dwelling. It shows groups of *three* eclipses and *one* eclipse about *every thirty seconds*, thus:—light, *eight and a half seconds;* eclipse, *two seconds;* light, *two and a half seconds;* eclipse, *two seconds;* light, *two and a half seconds;* eclipse, *two seconds;* light *eight and a half seconds;* eclipse, *two seconds.* It is visible from a distance of 9 miles. For arc of visibility, *see* Light list.

The period of this light may vary, but the groups of *three* occultations and *one* occultation will be maintained.

Buoy. — A bell-buoy, marking a sunken wreck, the position of which is not given, is moored in Burriana road.

Anchorage. — There is anchorage off Burriana in 5 to 6 fathoms water about three-quarters of a mile to the east-south-eastward of the lighthouse.

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Plan of Burriana road on 1571. Var. 13° 20′ W.

Communication.—The coast railway from Valencia passes through Burriana.

Trade.—Shipping.—Oranges of the value of £168,470 were exported from Burriana in British vessels in 1910.

The total number of steam vessels that entered the port the same year was 321, with a total tonnage of 255,529 tons, and 9 sailing vessels, with a total tonnage of 1,145 tons.

Plan of Castellon de la Plana road on 1571.

Castellon de la Plana.—At 6½ miles to the north-eastward of Burriana is the tower and Grao de Castellon de la Plana. The city, of which the Grao may be considered a suburb, is so named from the picturesque plain in which it stands; it had a population, at the census of 1910, of 30,583, is 3 miles from the coast, and may be seen from a considerable distance.

The village on the Grao or strand, consists of store and dwelling-houses for about 350 inhabitants, many of whom are fishermen.

Harbour works.—A small port sheltered by two breakwaters is being constructed, and consists of a northern breakwater extending east-south-eastward for 750 yards, and then being prolonged to the south-eastward for a further distance of 600 yards; a southern breakwater, 600 yards from the northern one and extending about 870 yards parallel to the inner part of the northern breakwater, and then trending north-eastward for a distance of 360 yards, leaving an entrance between the heads about 250 yards wide.

It is also proposed to construct two inner transversal moles.

In 1912 the northern breakwater was very nearly completed, and the southern breakwater for a distance of about 500 yards. Vessels drawing from 16 to 17 feet were able to shelter within the northern breakwater, and fruit lighters were loaded from quays on the breakwater.

LIGHTS (*Lat. 39° 58′ N., Long. 0° 1′ E.*).—A *group occulting white* light showing three eclipses *every thirty seconds*, thus:—light, *ten seconds;* eclipse, *two and a half seconds;* light, *ten seconds;* eclipse, *two and a half seconds;* light, *two and a half seconds;* eclipse, *two and a half seconds*, is exhibited, at an elevation of 26 feet above the sea, from a structure 20 feet in height, which is situated just within the angle formed by the arms of the northern breakwater; it is visible in clear weather from a distance of 10 miles.

A *fixed red* light, elevated 22 feet, and visible from a distance of 5 miles, is shown from a grey iron post, 14 feet high, erected on the outer end of the southern breakwater extension.

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Plan of Castellon de la Plana road on 1571. Var. 15° 20′ W.

A *fixed green* light, elevated 22 feet, and visible from a distance of 4 miles, is shown from a grey iron post, 14 feet high, erected on the outer end of the northern breakwater extension.

These lights are moved seaward as the work progresses.

Anchorage.—The outer anchorage is exposed to on-shore winds, and coasting vessels that trade here, leave directly easterly winds are expected.

Communication.—Railway communication with Valencia and Tarragona; telegraphic communication with all parts.

Trade. — Shipping. — Oranges of the value of £175,237 were exported from Castellon in British vessels in 1910.

The total number of steam vessels that entered the port the same year was 255, with a total tonnage of 182,218, and 25 sailing vessels, with a total tonnage of 1,390 tons.

Supplies. — Provisions and water required must be carted from the city.

Plan of Benicasim road on 1458.

Benicasim road. — The town of Benicasim, about 5 miles to north-eastward of Grao de Castellon, stands at the foot of a hill 2½ miles inland. Coasting vessels find in Benicasim road shelter from northerly winds, but it is necessary to leave directly there is a sign of an on-shore wind.

Anchorage. — The anchorage, about one mile from the shore, is in 4 fathoms water, with the hermitage of Padre Bartolo in line with Benicasim church, bearing 320° true.

Communication. — There is railway communication with Valencia and Tarragona, also telegraphic communication.

Chart 1320, Cape San Antonio to Cape Tortosa.

Cape Oropesa is the termination of Los Colls, a high range, with three conspicuous peaks: the northernmost, Monte Pinos, is 2,414 feet high, and Padre Bartolo hermitage is on the summit: these mountains are a good mark from seaward (*see* view, page 201). The extremity of the cape is low and salient, and forms three points. The town of Oropesa is on a small hill half a mile north-westward of the cape, and has a population of about 600.

LIGHT (*Lat. 40° 5′ N., Long. 0° 9′ E.*). — On the middle point of Cape Oropesa, a white circular tower, 41 feet in height, with a white dwelling, exhibits, at an elevation of 74 feet above the sea, a *fixed* and *flashing white* light *every two and a half minutes*, which is visible in clear weather from a distance of 15 miles.

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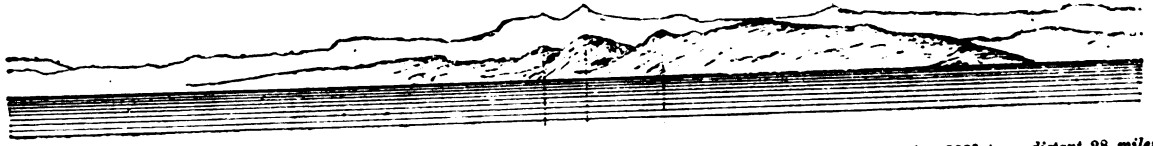
To face page 201.]



Los Colls. *Padre Bartolo hermitage, bearing* 303° *true, distant* 28 *miles.*
Pena Golosa, distant 47 *miles.*

La Ferrera. *Columbrete Grande lighthouse, bearing* 60° *true, distant* 8 *miles.* *La Horadada.* *El Bergantin.*

Columbretes islands from Barra Alta shoal.

La Ferrera. *Bauza.* *La Horadada.* *Columbrete Grande.* *El Mascarat.* *Mancolibre islet.* *El Bergantin.* *Cerquero.* 22° *true, distant,* 1½ *miles.*

Columbretes islands from the southward.

Mancolibre islet. *El Mascarat.* *Columbrete Grande.* *El Bergantin.* *La Horadada.* *Bauza.* *La Ferrera,* 190° *true, distant* 4 *miles.*

Columbretes islands from the northward.

Plan of Columbretes islands on 1458. Var. 13° W.

COLUMBRETES ISLANDS. — Distant 27 miles to the south-eastward of Cape Oropesa, are a number of rocky islands named the Columbretes, forming four groups and extending over a space 3 miles long north and south. *See* view on plan and views facing page.

All these islands are steep-to and the greater part of them inaccessible; the bank from which they rise extends about 15 miles to the southward, and on it there are depths of from 35 to 45 fathoms. The channels which separate the groups are deep, having depths of from 25 to 35 fathoms, over gravel and shells, decreasing towards the islets and banks, but near which there are generally from 9 to 18 fathoms. Between the islands and the mainland the depths are from 45 to 55 fathoms water, generally over sand. There is a considerable sea in the vicinity, with easterly gales, and a wide berth should be given to them at night.

Columbrete Grande (ancient Ophiusa), the largest of the islands, is about 4 cables in length, in a north and south direction, and shaped like a crescent with the horns to the eastward; the bay which it forms, named Port Tofiño, is 2 cables across at the entrance, 3 cables deep, and has from 4 to 18 fathoms water, over rocky and foul bottom.

The island forms a saddle having at either end a hill covered with vegetation, the northern and higher of which is 224 feet high; the low part is of lava and rock, showing its volcanic origin, and it may be presumed the bay is the mouth of an ancient crater.

At the extreme of the southern horn are two detached high, conical rocks, extending in a north-east direction and forming part of the mouth of the crater. Mancolibre islet, the outer, is 98 feet, and El Mascarat, the inner, 115 feet high, and in the boat passages between there are 2½ and 3½ fathoms water. *See* views facing page.

The bay should only be resorted to during fine weather in summer, for it often happens, especially in winter, that south-west winds are succeeded by calms, and easterly winds set in suddenly and blow fresh, when only a steam vessel could get out.

LIGHT (*Lat. 39° 54′ N., Long. 0° 41′ E.*). — On the hill at the north-eastern end of Columbrete Grande, a white, conical tower, 67 feet in height, exhibits, at an elevation of 278 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 22 miles.

Buoy.—A buoy is moored nearly in the centre of the port.

La Ferrera or Malaspina island. — At 6 cables westward of Columbrete Grande is a group of steep, inaccessible islets, the largest of which, named La Ferrera or Malaspina island, is 144 feet high,

Plan of Columbretes islands on 1458. Var. 13° W.

has the form of a saddle, and is about 1½ cables in length in a northerly and southerly direction.

Close to the southward are Navarrete and Valdes islets, and to the eastward another named Bauzá, which is round and pyramidical, 72 feet high, and has Espinosa, a smaller islet, on its eastern side. They are all broken, steep to the northward, and skirted by rocks, with deep water between them. *See* views, page 201.

Fidalgo bank, about a cable to the south-eastward of Navarrete islet, is an oblong, rocky shoal, 2 cables in length in a northerly and southerly direction, with 7 feet least water on it. Ciscar bank, with a similar depth over it, lies midway between the north-west end of Fidalgo bank and Navarrete island.

La Horadada (Ferrer) islet. — At about three-quarters of a mile southward of Navarrete islet is another group similar to the former, the largest islet of which, named Horadada, is 180 feet high, and in the form of a wedge. *See* views, page 201.

Joaquin rock, 1½ cables to the north-westward of Horadada, is a rock above water, with shallow water round it; and 1½ cables to the north-westward is Jorge Juan bank, with 9 fathoms water over it.

El Bergantin (Galiano) islet. — A group composed of 10 rocks lies nearly 3 miles southward of the lighthouse on Columbrete Grande. The largest of these rocks, named El Bergantin, is 105 feet high, and at a distance appears like a vessel under sail. El Cerquero, 19 feet high, Baleato, and Churruca rocks, 10 feet high, the next in size, are rugged, and in bad weather the sea breaks heavily on them. *See* views, page 201. The Luyando reef, the eastern danger, is just above water, and breaks when there is any sea.

Chart 1320, Cape San Antonio to Cape Tortosa.

Barra Alta shoal (*Lat. 39° 49′ N., Long. 0° 33′ E.*) consists of a rocky patch, about 4 cables in length, east and west and 1½ cables broad, with a general depth of less than 16 fathoms, but there are two small rocky heads, close together, with 6 to 7½ fathoms water over them. The position of this shoal as determined by the Spanish Government surveying vessel *Peles* is, Columbrete Grande lighthouse bearing 60° true, distant 8$\frac{1}{10}$ miles; the depths around the shoal increase rapidly to 50 fathoms, over sandy bottom, at distances of from 3 to 4 cables.

Coast. — At 1¼ miles north-north-eastward of Cape Oropesa is the bar of the Chinchilla river, and between this and Torre Blanca, a distance of about 7 miles, the land is marshy; midway there is a small hilly group, on which are Albalat castle and three towers.

From Capicorp, 9 miles north-north-eastward of Cape Oropesa, to Peñiscola, there are some small sandy beaches and ravines, the land

Chart 1320, Cape San Antonio to Cape Tortosa. Var. 13° W.

rising rapidly to the San Benet range, 1,670 feet above the sea, at about 2 miles from the coast; Almudun tower, 8 miles from Capicorp, is a conspicuous object.

Plan of Peñiscola road on 1187.

Peñiscola.—The small peninsula of Peñiscola, appearing like an island, is 20 miles north-eastward of Cape Oropesa, and connected to the mainland by a low neck. The peninsula is a rocky hummock, 240 feet high, 450 yards long, north and south, and 275 yards east and west, surrounded by fortifications which enclose the town, and on its summit is a castle, a large quadrangular building seen from a great distance. The population of the town is about 3,000.

LIGHT (*Lat. 40° 21′ N., Long. 0° 24′ E.*).—From a yellow octagonal tower, 33 feet high, on Papa Luna battery, an *alternating fixed* and *flashing* light showing *fixed white* with a *red flash every minute*, is exhibited at an elevation of 180 feet above the sea; it is visible, in clear weather, from a distance of 18 miles. For arc of visibility, *see* Light list and plan.

Anchorage. — The roadstead is little frequented, being exposed to winds from N.E., round by East, to South, which in winter set in suddenly and blow strong. In summer it is resorted to during north-westerly and westerly winds. The best berth is eastward of the town in 6½ fathoms water, over fine sand, 3½ cables from the peninsula, but a vessel should leave the anchorage should there be any signs of an easterly wind.

Supplies.—A few provisions may be procured and water obtained from a spring at the point without the town, at the western bastion.

Chart 1320, Cape San Antonio to Cape Tortosa.

Benicarló.—From Peñiscola the coast is low and flat. The town of Benicarló, with 7,200 inhabitants, is 3½ miles from Peñiscola and stands on a plain scarcely a mile from the sea; it is surrounded by a wall and a ditch, and contains an old castle, a church, convent, and hospital; its chief trade is in wine.

LIGHT.—From a yellow iron column 17 feet in height, and rising from the centre of the keeper's dwelling, situated about 40 yards from the sea, is exhibited at an elevation of 38 feet above the sea, a *white group occulting* light *every fifteen seconds*, showing *three* eclipses, each of *one and a half seconds* duration; the light between the eclipses showing for *two seconds*, and between the groups for *six and a half seconds*.

This light is visible from a distance of 10 miles in clear weather.

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Chart 1320, Cape San Antonio to Cape Tortosa. Var. 13° W.

Fuerza and Barbada rocks. — Fuerza rock, with 16 feet water over it, is situated about a mile to the southward of Benicarló, and this general depth is found at 3¼ cables from the shore. Barbada rock extends rather more than two cables from the shore, and has depths of from 23 to 29 feet over it; from the northern extreme Benicarló church bears about 274° true.

Anchorage.—Coasting vessels anchor off the beach in from 2¾ to 6½ fathoms water, over sand.

Plan of Vinaroz on 1187.

Vinaroz. — The town of Vinaroz, with a population of 9,926, stands on the beach 3½ miles beyond Benicarló; it has a ship-building yard, and active fisheries, and a coasting trade in brandy and salt. An artificial harbour has been constructed here.

Breakwaters. — The eastern breakwater curves from Galera point in a south-easterly and southerly direction for a distance of 800 yards.

The western breakwater from close to Plaza de Toros, extends in a south-easterly direction for 390 yards and then curves inwards for 100 yards, leaving a space of about one cable between the heads of the two breakwaters. The harbour, thus enclosed, has depths of from 3¼ to 3¾ fathoms in its outer part, and from 3 to 3¾ fathoms in the entrance.

LIGHTS (*Lat. 40° 28′ N., Long. 0° 29′ E.*). — A *white group occulting* light is exhibited, at an elevation of 37 feet above the sea, from a grey iron standard, 30 feet high, erected on the extremity of the east breakwater. It shows groups of *two* eclipses about *every ten seconds*, thus:—light, *five seconds;* eclipse, *two seconds;* light, *one second;* eclipse, *two seconds;* and is visible from a distance of 10 miles.

The period of this light may vary, but the groups of two eclipses will be maintained.

A *fixed red* light is shown at an elevation of 27 feet above the sea, from a green iron post 20 feet in height, situated at the head of the west breakwater; it is visible from a distance of 5 miles in clear weather.

Life-saving apparatus.—A lifeboat and rocket apparatus are stationed at Vinaroz.

Communication.—Railway communication with Valencia and Tarragona; telegraphic communication with all parts.

Chart 1320, Cape San Antonio to Cape Tortosa.

Alfaques de Tortosa.—At 8 miles north-eastward of Vinaroz, the land rises in the interior to the Sierra Montsiá, attaining an

Chart 1320, Cape San Antonio to Cape Tortosa. Var. 13° W.

elevation of 2,506 feet. The coast is composed of small cliffs (interrupted by short beaches) as far as the town of San Carlos de la Rapitá, eastward of which the land becomes low and swampy, forming lagoons, channels, and a vast number of islands covered with rushes. These extend in a north-easterly direction, and occupy a space within 15 miles of coastline, from the foot of the sierra to the mouths of the Ebro, form the delta of that river, and are named the Alfaques de Tortosa. The Rio Cenia, 3½ miles north-westward of Vinaroz, is the boundary between the provinces of Castellon and Tarragona.

Plan of Port Alfaques on 1371.

PORT ALFAQUES (*Lat. 40° 33′ N., Long. 0° 35′ E.*), formed by the delta of the Ebro, is one of the best on the south coast of Spain, sheltered from all winds, with room for a large number of vessels not drawing more than 18 feet water. It is 7 miles in length, east and west, and 2 miles in breadth, the entrance, open to the south-west, being rather more than 1½ miles in width.

The port has been formed entirely by alluvium, or the mud or other substances discharged by the Ebro; all the land on the north and east is marshy and intersected by lagoons and channels. In summer, intermittent fever is prevalent.

Aspect. — The Sierra Montsia, which rises between Alcanar and Amposta, is an excellent mark for Port Alfaques. It has several remarkable peaks; Pare Pascual is the highest, 2,506 feet, and lies 3 miles westward of San Carlos; immediately northward of Pare Pascual is El Baul, 2,493 feet, and about a mile in the same direction, is Horadada, or Picacho, 2,290 feet high. Thence the mountain descends to the Ebro, having on its northern shoulder the peak Montsianet, 968 feet high, and about 2 miles southward of Amposta.

The mountain named Pena de Bel, 3,293 feet high, lies about 16 miles westward of the Sierra Montsia, and is a good distant mark for Port Alfaques.

Depths. — The general depth in the central part of the port is 3¾ fathoms; nearer the shore and also at the head of the port there are extensive mud-flats with from 6 to 12 feet water.

Cape Baña is the southern extreme of El Baña peninsula, which bounds the southern part of the port; Corballera point is the south-western extreme, and Galacho point the north-western. All the peninsula is low and swampy.

A tongue of sand, 2½ miles in length and a cable in width, separates the eastern part of the port from the sea, and connects Baña peninsula with the rest of the Alfaques. This strip of muddy sand, known as

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Plan of Port Alfaques on 1571.. Var. 13° 10′ W.

the Playa de Trabucador, is compact, slightly elevated, shoal, and dangerous seaward.

Caution.—The southern coast of El Baña peninsula is advancing seaward and the depths are known to have decreased with the advance of the coast, so caution is necessary when approaching it. It is also thought probable that the depth in the channel may have also decreased; pending an examination, mariners are advised to take a pilot or proceed with caution.

LIGHTS (*Lat. 40° 34′ N., Long. 0° 40′ E.*). — On Cape Baña, a white conical iron tower 61 feet in height, with a dark-coloured lantern, exhibits, at an elevation of 62 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 13 miles.

On Sanieta point, three-quarters of a mile south-west of the town of San Cárlos de la Rápita, a grey circular tower, 22 feet in height, exhibits, at an elevation of 30 feet above the sea, a *fixed red* light, which is visible in clear weather from a distance of 7 miles.

Directions.—From the eastward care should be taken in passing the mouths of the Ebro, and the land between Cape Baña and Galacho point, which, as already mentioned, has advanced considerably to the south and west, and when Mount Pare Pascual bears 230° true Cape Baña may be rounded.

From the southward, steer along the coast at a distance of a mile, but when entering in a sailing vessel, if blowing hard from the north-westward, be prepared for heavy squalls and eddies which blow down from the high land. A vessel from the eastward, with easterly winds and dark gloomy weather, should not close the port until the land is made out, as the current sets strongly towards it.

At night, coming from the eastward, Sanieta point light bearing 345° true will lead in clear of Corballera point, and coming from the westward the same light bearing 22° true will lead to the entrance. In all cases the lead is the best guide.

Anchorage. — The most dangerous winds are the Maestrales or north-westers, which blow with such violence as to require caution, for the bottom, being of light loose mud, the anchors are liable to drag. North-easterly winds cause some sea, but are not so inconvenient. South-westerly winds also raise the sea, but with no bad result if the vessel be properly moored.

The best berth is with Mount Guardiola bearing about 302° true, and Galacho point in line with Peñiscola castle, 214° true. In this position a vessel will be sheltered from the south-westerly sea, and be clear of the eddy winds, which in north-westers blow down with much violence from the Sierra Montsiá. Vessels loading salt anchor near

General charts 1320, 1187, 1, 2158a, 449.

Plan of Port Alfaques on 1571. Var. 13° 10′ W.

San Juan tower, and those with cargo for the town choose a convenient berth for discharging. San Cárlos beach is much exposed from the south-westward. When the anchors have been long down they sink deeply in the mud, and should therefore be sighted occasionally.

Sea level. — Although there are no tides in this part of the Mediterranean, considerable elevations and depressions of the water are observed in the port, occasioned by the winds. The water is higher with winds from East, round by South, to S.W., and lower when the wind is from the other quarters, and in proportion to the force of the wind.

Town (*Lat. 40° 37′ N., Long. 0° 36′ E.*). — The town of San Cárlos de la Rápita in the north-west angle of the port, stands on the slope of Mount Guardiola, which is 380 feet high and has a tower on its summit. The town consists of some handsome houses, spacious streets, large squares, churches, magazines, barracks, &c. Population about 4,000. The town of Amposta, with a population of about 3,000, is on the right bank of the Ebro, 5 miles below Tortosa.

Communication.—San Cárlos de la Rápita communicates with Amposta and the Ebro by means of a canal, 5½ miles in length, but with only about 1½ feet of water in it.

Supplies. — San Cárlos is deficient of water and other supplies: but during off-shore winds water may be obtained at Alcanar, a short distance from the beach, and supplies of provisions may be procured at Vinaroz.

Chart 310, Cape Tortosa to Cape St. Sebastian.

Rio Ebro. — The Ebro, the largest river of the peninsula, enters the sea at Cape Tortosa, by two branches, named respectively the South and Main channels, but its navigation is limited on account of its shallow delta and numerous banks, and only vessels of light draught (4 to 6 feet) are able to pass the bars. At Amposta, on its south bank, it is about 300 yards wide, thence in order to facilitate the communication with the sea, a canal runs southward to San Cárlos, a distance of 5½ miles, but in 1882 it had only a depth of 1½ feet, and was principally used for purposes of irrigation.

The principal commercial utility of the Ebro is the transport of grain from Zaragoza (a large town containing 105,788 inhabitants) to Tortosa, together with the floating down of timber from the Pyrenees. Steamers of light draught go up as far as Mequinenza, and boats as high as Tudela. The town of Tortosa (ancient Dertosa), a walled town containing about 25,000 inhabitants, stands on the left bank of the Ebro, about 25 miles from the mouth, on the slope of a high hill.

Pilots are necessary for all vessels entering the Ebro.

General charts 1320, 1187, 1, 2158a, 449.

Chart 310, Cape Tortosa to Cape St. Sebastian. Var. 13° W.

Communication. — Tortosa has railway communication with Valencia and Tarragona, also telegraphic communication.

CAPE TORTOSA.—At about 3 miles beyond the South channel, which has about 3 feet water in it, is the Main channel, another entrance to the Ebro; Buda island divides these two channels. East channel and North channel lie northward of these two channels. All these channels have bars at their entrances, the depths over which vary with the freshes; they are navigated by flat-bottomed vessels expressly adapted for the Ebro.

Buda island, between the two arms of the Ebro, and formed of the deposit or alluvial soil brought down the river, is low and level, and increases in size every year. It is of a triangular form extending about 3½ miles east and west, and in part cultivated, the trees from seaward appearing to grow out of the water.

The eastern extreme of Buda island, known as Cape Tortosa, is low and at times overflowed, with shifting sandbanks off it, one of which has recently grown up, leaving 3½ feet water between it and the shore. Approaching from the southward, there are from 9 to 11 fathoms water at 3 miles, and 13 to 18 fathoms at 5 miles distant. The breakers on the bars of the Ebro extend south-eastward a mile from the lighthouse. Vessels in a heavy sea should give it a berth of 2 miles.

LIGHT (*Lat. 40° 43′ N., Long. 0° 54′ E.*). — On Cape Tortosa a grey circular tower, 167 feet in height, exhibits, at an elevation of 174 feet above the sea, a *fixed* and *flashing white* light *every minute*, which is visible in clear weather, the *fixed* from a distance of 17 miles, the *flashing* 20 miles.

Directions.—With on-shore gales there is a heavy sea; in thick weather or on a dark night, it will be prudent not to stand into less than 30 fathoms water. Caution is also necessary when passing the Alfaques at night, with fresh off-shore winds, as those from north-westward, which in winter blow with considerable force, cause sailing vessels to hug the land, and accidents have occurred on the shoals which extend from the cape.

Current. — With north-easterly or easterly winds the water is forced into the Gulf of San Jorge north of the cape, causing a strong current towards it.

Plan of Ampolla road and Port Fangar on 1458.

Port Fangar. — Fango point, formed like all parts of the Alfaques, by the deposit of the Ebro, which the south-easterly gales drive to the north-westward, is advancing and threatens to close the Port of Fangar. The port is adapted only for small vessels during westerly

Plan of Ampolla road and Port Fangar on 1458. Var. 13° W.

winds, but if necessary, those under 8 feet draught may find shelter with the wind as far round as E.S.E. by anchoring in the bight formed by Fango point, from which a bank which dries extends westward 3 cables, the bottom is generally mud.

LIGHT (*Lat. 40° 47′ N., Long. 0° 46′ E.*). — A *fixed white* light is exhibited, at an elevation of 25 feet above the sea, from a grey circular iron tower, 22 feet in height, on Fango point; it is visible in clear weather from a distance of 10 miles. In rounding the point, the lighthouse should have a berth of a mile, and attention be given to the lead.

Ampolla road, formed between Fango point and Cape Roig about 2 miles northward of it, has depths of from 3 to 6 fathoms. Its low, sandy shore is bordered by shallow water, and there are only a few houses at Ampolla in the north-west angle of the bay; a branch of the Ebro Canal Vell enters the bay about 2 miles southward of Ampolla, with a watch tower at the entrance, and the land adjacent to the port is low, swampy, and nearly impassable. Scarcely any drinkable water is to be found.

Chart 310, Cape Tortosa to Cape St. Sebastian.

Gulf of San Jorge. — The bend of the coast between Capes Tortosa and Salou is named the Gulf of San Jorge, the latter cape being 23½ miles north-eastward of the former, and the bight 10 miles deep. The greater part of the coast is rocky, with small sandy beaches, and of moderate elevation, but the land in the interior is high. The eastern part of the coast is low and sandy, and can only be approached with off-shore winds. It is dangerous for sailing vessels with on-shore winds, as a strong current sets into it, and the land of Cape Tortosa being low, is difficult to be seen in dark, gloomy weather.

Coast. — Aguila point, 2½ miles north-north-eastward of Cape Roig, has an islet surrounded by sunken rocks, lying westward of it and three-quarters of a mile northward is Mount Aguila, 456 feet high; 2¼ miles north-westward of the point there is an old telegraph tower on Coll de los Guardias, 807 feet high.

Cape San Jorge, 5 miles north-eastward of Aguila point, has a ruined fort on it, and nearly 2 miles further in the same direction, Cape Termino, is low and rocky and on a sandy beach near it there is a building in connection with a tunny fishery.

The land about this part is generally arid and uninhabited; 6½ miles to the westward El Pá de San Jordi, a conical peak 1,273 feet; and 5 miles further in the same direction Cruz de los Santos, 3,100 feet high, are both conspicuous. The tower on Coll de los Guardias is also plainly seen from this part of the coast.

General charts 1187, 1, 2158a, 449.

Chart 310, Cape Tortosa to Cape St. Sebastian. Var. 13° W.

Llastres point is 4½ miles north-eastward of Cape Termino, the coast between being backed, at about 2 miles distant, by the Sierra de Balaguer, the most conspicuous summits at the western end of the range being Los Frailes, three peaks, 1,542, 1,109, and 1,079 feet high respectively; about a mile eastward of these, La Mamelleta, another peak, is 2,339 feet high.

San Felipe castle, in ruins, is about 2 miles north-north-eastward of Cape Termino and on Llastres point, a small hospital, a large ruined convent and an old telegraph tower are conspicuous.

Tunny fishery.—Tunny nets extend from the shore about midway between Cape Termino and Llastres point during the season, 1st February to 30th October. For Lights, marks, and caution, *see* page 73.

Cambrils, a small town with 2,545 inhabitants, is situated 7½ miles north-eastward of Llastres point and three-quarters of a mile from the coast; it offers few resources.

Westward of Cambrils are the summits of Llaveria and Escornalbou, 3,022 and 2,077 feet high, respectively, the former having a pillar, and the latter (conical shaped) a large convent, on its summit; San Ramon hermitage and the church steeples of Botarell Montbrio and Vinols are also conspicuous.

Communication. — Cambrils has railway communication with Valencia and Tarragona, also telegraphic communication.

Life-saving apparatus. — A rocket apparatus is stationed at the town of Cambrils.

Plan of Salou road on 1458.

Salou road lies 3 miles eastward of Cambrils, between Riudoms point and Cape Salou.

Cape Salou.—At the termination of the sandy shore forming the roadstead of Salou, the coast becomes high, rocky and bold, and extends about 1¾ miles in a south-south-easterly direction to Cape Salou. The cape is higher than the land within it, and from a distance appears like a low black island with white patches on it. *See* view, page 215.

LIGHT (*Lat. 41° 3′ N., Long. 1° 10′ E.*). — On Cape Salou, a yellow circular iron tower, 35 feet in height, exhibits at an elevation of 139 feet above the sea, a *fixed* and *flashing white* light, *every four minutes;* it is visible in clear weather from a distance of 18 miles.

Signal station.—Semaphore.—A semaphore is situated on a hill, about 1½ miles northward of Cape Salou, at an elevation of 253 feet above the level of sea. *See* page 67.

General charts 1187, 1, 2158a, 449.

Plan of Salou road on 1458. Var. 13° W.

Anchorage. — At 2 cables from the shore there are from 3 to 4 fathoms water, over sandy bottom with patches of weed; large vessels should anchor in 6½ to 7 fathoms water about 5 cables southward of the mole; the holding ground is good, and vessels are sheltered from winds northward of East. This is the only place of refuge eastward of Barcelona, during Levanters, for sailing vessels which are unable to get into that port or Tarragona; but as the anchorage is exposed from the south-east quarter and southerly winds set in suddenly, vessels should leave when the wind, which caused them to seek shelter, has subsided.

Tunny fishery. — Tunny nets are laid out during the season, 1st February to 30th October, about one mile southward of the mole at Salou. For Lights, marks, and caution, *see* page 73.

Town. — The town of Salou lies near the coast; there is a small mole for landing and embarking cargo. The town of Reus is situated about 4½ miles northward of Salou, and has a population of 27,000.

Communication. — Salou has railway communication with Reus, Valencia and Tarragona, and a separate line connects Reus with the latter town.

Water may be obtained from a fountain near the Custom-house. *Plan 344, Port of Tarragona.*

PORT OF TARRAGONA (*Lat. 41° 7′ N., Long. 1° 14′ E.*). —The Port of Tarragona, 4 miles north-eastward of Cape Salou, is artificially formed between two moles, and affords protection to a large number of vessels; the eastern mole, Muelle de Levante, extends from the town of Tarragona in a south-south-west, south-west, and west direction for about 7 cables, and is 17 feet above the sea, and terminates in a semi-circular head; from this mole a short arm, Muelle Paralelo al de Costa, about 1½ cables in length, extends in a westerly direction at 800 yards within the head.

The eastern mole is being extended in a south-westerly direction for a distance of 500 yards. A temporary white conical buoy lies about one cable westward of the end of the extension, and eight buoys, in the arc of a circle, mark the end of the extension.

The western mole, Dique Transversal, curves to the eastward and south-eastward for a distance of about 3 cables, and from its commencement another arm, Dique del Oeste, extends for about the same distance in a westerly direction and parallel to the shore, forming with it the outlet of the Rio Francoli.

South-westerly winds blow directly in the port and send in a considerable sea, and westerly and particularly north-westerly winds blow strong in winter, when vessels should be moored with good stern-fasts. Vessels moor with their sterns close in, and secured to the mole at right angles to it, with one or two anchors in a north-westerly direction.

General charts 310, 1187, 1, 2158a, 449.

Plan 344, Port of Tarragona. Var. 12° 50′ W.

Depths.—There are depths of 24 to 30 feet in most parts of the inner harbour, 26 to 30 feet in the entrance, and 12 to 22 feet in the outer harbour, which is subject to considerable silt from the Rio Francoli; but a depth of 29 feet can be carried into the inner harbour. Dredging is carried on from time to time.

LIGHTS.—Muelle de Levante (*Lat.41°6′N.,Long.1°14′E.*). —An *occulting white* light *every six and seven-tenths seconds*, thus:—light, *five and a half seconds;* eclipse, *one and two-tenths seconds*, is exhibited at an elevation of 54 feet above the sea, from a wooden tower, 33 feet in height, near the head of Muelle de Levante; it is visible in clear weather from a distance of 8 miles. A *fixed green* light is shown about 40 yards outside the previous light; it is visible from a distance of 2 miles.

These lights in line indicate the direction of the extension works of Muelle de Levante.

Dique Transversal.—On the extremity of Dique Transversal a *fixed red* light is exhibited, at an elevation of 27 feet above the sea, from a movable crane, 20 feet in height, and is visible in clear weather from a distance of 5 miles. Two temporary *fixed red* lights are exhibited from the inner end of Dique Transversal, to show the extremity of the extension of Muelle de Levante.

Muelle Paralelo.—A *fixed green* light is exhibited, at an elevation of 24 feet above the sea, from an iron column, 16 feet in height, near the head of Muelle Paralelo al de Costa; it is visible in clear weather from a distance of 7 miles.

Directions. — The town of Tarragona is visible at a great distance, appearing isolated from the land around it, the hill on which it stands rising almost abruptly from the shore. On nearing it, the lighthouse, mole, and shipping will be seen. Sailing vessels, entering the port with fresh easterly winds, should pass the white buoy off the extension of Muelle de Levante at a distance of half a cable under sufficient sail, luffing up short to the harbour, as the winds draw to the north-east within the mole. A store of anchors and hawsers is kept ready for the use of vessels requiring them.

Anchorage. — In the roadstead there is anchorage in 15 to 30 feet, sheltered from the eastward.

City.—The city of Tarragona (the Tarraco of the Romans) stands on a hill 361 feet high with a steep incline to the sea on the east, but less abrupt to the westward. The old town occupies the summit of the hill, and has some valuable relics of antiquity, and a few miles beyond Mont Blanche station on the Lerida line of railway are the ruins of the once celebrated convent of Poblet, the burial place of the kings and of some of the most eminent men of Spain. The modern town extends like an amphitheatre along the south-west slope of the

Plan 344, Port of Tarragona. Var. 12° 50′ W.

hill, and terminates at the sea; it has a magnificent cathedral and archbishop's palace. The population by the last census was 25,000: a British Vice-Consul is resident. The Rio Francoli enters the sea during winter on the west side of the town.

Communication.—Tarragona has railway communication with Alicante and Barcelona; there is a line to Lerida and also to Zaragoza, viâ Reus, from which there is a branch to Salou; telegraphic communication with all parts. The telegraph office is always open.

Coal and supplies.—About 10,000 tons of coal are usually kept in stock, and can be put on board at the rate of 350 tons in 24 hours; coaling is carried on by baskets, and there are 10 lighters, holding from 15 to 25 tons. Permission must be obtained to go alongside Muelle Paralelo, which is 862 feet in length, with a depth of 27 to 28 feet. Westerly winds may impede or prevent coaling.

Limited supplies of fresh provisions and vegetables may be procured, and good water may be obtained from a fountain on a mole near the Pratique office, and also from water-boats holding 2 to 18 tons.

Life-saving apparatus.—A lifeboat and rocket apparatus are maintained at Tarragona.

Trade.—The exports consist of wine, filberts ("Barcelona nuts"), almonds, and oil, and the principal imports of coal, wheat, codfish, timber, manures, staves, and sulphur.

Shipping.—In 1910, 546 steam vessels, with a total tonnage of 464,595 tons, entered the port, and 28 sailing vessels, with a total tonnage of 4,675 tons.

Chart 310, Cape Tortosa to Cape St. Sebastian.

Cape Gros (*Lat. 41° 8′ N., Long. 1° 24′ E.*), 6½ miles eastward of Tarragona, has shallow water skirting it, but the rocks do not extend for any distance. The town of Torredembarra, with a population of about 2,700, stands over the cape, and a mile farther west are Altafulla and Tamarit.

Life-saving apparatus.—A lifeboat is maintained at Torredembarra.

San Cristóbal point.—Eastward of Cape Gros the coast is low, being nearly all sandy beach, the land gradually rising in the interior to lofty mountains, and trending in an easterly direction for 16 miles to the point and chapel of San Cristóbal, situated at the end of this extensive beach. Although clear of danger, sailing vessels should only approach the coast with off-shore winds. The Rio Foix, a small stream which runs into the sea 3 miles westward of San Cristóbal point, is the boundary between the provinces of Tarragona and Barcelona.

General charts 1187, 1, 2158a, 449.

Chart 310, Cape Tortosa to Cape St. Sebastian. Var. 12° 40′ W.

LIGHT (*Lat. 41° 13′ N., Long. 1° 43′ E.*). — On San Cristóbal point, near the coast, a grey conical tower, 62 feet high, with a keeper's dwelling at its base, exhibits, at an elevation of 89 feet above the sea, a *white group flashing* light, which shows groups of *three* flashes about *every eight seconds*, thus:—flash, *two-tenths of a second;* eclipse, *one and a half seconds;* flash, *two-tenths of a second;* eclipse, *one and a half seconds;* flash, *two-tenths of a second;* eclipse, *four and four-tenths seconds.* The light is known as the light of Villanueva y Geltrú, and is visible in clear weather from a distance of 15 miles. For arc of visibility, *see* Light list and chart.

The period of this light may vary, but the groups of *three* flashes will be maintained as its principal characteristic.

El Mantanazo bank, of small extent, with 10 fathoms over it, lies 3 miles south of the lighthouse.

Villanueva and Geltrú, two towns situated to the northward of San Cristóbal point, are so close together that they appear as one, and contain about 12,000 inhabitants; they may be recognised by the church steeples and high chimneys of the factories. The port of Villanueva, situated to the west of San Cristóbal point, is a small bay with a beach, it should be approached only with off-shore winds.

Buoys. — Two red mooring buoys with Villanueva y Geltrú in white letters on them, are moored off the town for the convenience of vessels.

Supplies. — Fresh provisions may be procured and water from the Marina.

Life-saving apparatus. — A lifeboat is stationed at Villanueva.

Coast. — The coast from San Cristóbal point, rises and becomes mountainous in the interior for 10 miles, where Mount Morella attains the height of 1,952 feet above the sea; along the coast eastward, there are lofty precipices named the Garraf coast, after a village inland. The coast is bold and clear of danger, with several sandy bays, of which Sitges, 3½ miles from San Cristóbal point, affords shelter for small vessels from westerly winds under Cape Grills, the western extremity of the bay.

The town of Sitges, with about 3,500 inhabitants, stands on the coast, and carries on a moderate trade in wine, which is embarked in coasting vessels. A reef, half a cable in length, with 8 feet water on it, extends from the middle of the beach.

Monserrat mountain. — To the northward of the coast of Garraf about 22 miles inland, the celebrated mountain of Monserrat

Salou. *Grosa point.*

Cape Salou lighthouse,
bearing 340° true, distant one mile.

Monserrat mountain,
bearing 324° true, distant 30 miles.

Tibidabo.

Barcelona.
Monjuich castle,
348° true, distant 10 miles.

Sierra del Monseny (Matagalls)
12° true, distant 38 miles.

Barcelona approach.

Sierra del Monseny,
bearing 319° true.

Malgrat.
Palafolls castle,
bearing 351° true, distant 12 miles.

Blanes castle,
5° true, distant 12 miles.

Chart 310, Cape Tortosa to Cape St. Sebastian. Var. 12° 40′ W.

rises 4,052 feet above the sea; extending east and west, it terminates in numerous conical peaks of calcareous rock of different colours, destitute of all vegetation; and being seen from a great distance, is an excellent landmark. On it is a convent and the ruins of former hermitages. *See* view facing page.

Garraf. — At Garraf, 8 miles eastward of Villanueva, a small harbour has been constructed, affording shelter to small vessels, in depths of from 10 to 13 feet.

Plan 1195, Approach to Port of Barcelona.

Barcelona approach. — Rio Llobregat. — A low sandy beach commences about 3 miles eastward of Garraf tower and extends for about 9 miles to the mouth of the Rio Llobregat, which runs into the sea through the sand which is continually advancing to the south-east. The mouth of this river is 3½ miles southward of Barcelona, its course is about 100 miles, and it brings down a considerable volume of water: a sandbank extends nearly a mile from its mouth.

Vessels, rounding this elbow of the coast when bound to or from Barcelona, should give it a berth of 2 miles, and every attention should be paid to the use of the lead as the sea and currents set in over the breakers, which extend considerably to the south-eastward. Excepting about the mouth of the Rio Llobregat, the beach is clean and bold.

LIGHT (*Lat. 40° 19′ N., Long. 2° 9′ E.*). — At 4½ cables to the northward of the mouth of Rio Llobregat, and 2 cables from the coast, is a white square tower with an octagonal upper part, and having a red two-storey building close to it, 102 feet in height: it exhibits, at an elevation of 106 feet above the sea, a *fixed* and *flashing white* light *every half minute*, and it is visible in clear weather from a distance of 16 miles.

Wireless telegraph station.—There is a wireless telegraph station, open always to the general public, about 2 miles westward of Llobregat lighthouse. The call letters are E.A.B.

Shoal. — Shoal water extends nearly half a mile from the mouth of the river, and 1½ miles to the southward of the lighthouse.

Bell-buoy. — A red and white bell-buoy marks the edge of the 5-fathom line off the river mouths, but the buoy is liable to be washed away.

General charts 1187, 1, 2158a, 449.

Plan of Port of Barcelona on 1195. Var. 12° 30′ W.

Mount and castle of Monjuich.—At 3 miles northward of the mouth of the Llobregat, is an isolated hill named Monjuich, elevated 679 feet above the sea, and bounded on the land side by a plain; the red cliffs facing seaward being washed by the sea. On its summit is an extensive fortress, which commands the city and port of Barcelona, and being easily recognised at a distance, is an excellent mark. A watch tower rises from the fortifications, and from it the particulars of all vessels in sight are signalised to Barcelona. *See* view, page 215.

LIGHT (*Lat. 41° 21′ N., Long. 2° 10′ E.*).—From a tower 17 feet high, surmounting a white dwelling erected at a distance of 1½ cables southward of Monjuich watch-tower, is exhibited a *white group flashing* light showing groups of *two flashes every ten seconds*, thus:—flash, *three-tenths of a second*, eclipse, *one and four-tenths seconds;* flash, *three-tenths of a second;* eclipse, *eight seconds*. It is elevated 308 feet above the sea, and is visible from a distance of 22 miles in clear weather. For arc of visibility, *see* Light list and Plan.

The period of this light may vary, but the groups of *two* flashes will be maintained as its principal characteristic.

THE PORT OF BARCELONA consists of three inner ports, Darsena del Comercio, Darsena Nacional, and Darsena de la Industria; and two outer ports, Darsena de San Beltran or Ante Puerto, and Darsena del Morrot, the latter being still under construction, but it is hoped to complete it in 1912.

The whole space is enclosed by several moles, the outer one, Dique del Este, extends from the southern part of Barceloneta in a southerly direction for a distance of about 1,600 yards, where there is a curved arm, inside of which quays are under construction. From the end of the curved arm the mole is being extended southward for a further distance of 1,500 yards; the extremity of the works is marked by two buoys. On the inner side of Dique del Este are two moles, Muelle de Baleares, which encloses Darsena de la Industria, and Muelle de Cataluna where the floating dock lies and which is slightly extended outwards.

The inner side of the harbour is formed by moles stretching from its head along the coast to Dique del Oeste, a distance of about 1,800 yards, and work is in progress to continue the coast mole to Morrot point, a further distance of 800 yards. Four moles extend from the coast mole, Muelle de España, near the head of the port, which is still under construction, and which will, when completed, separate Darsena del Comercio and Darsena Nacional; Muelle de Barcelona, which runs out at right angles to the coast mole, is 557 yards

General charts 310, 1187, 2158a, 449.

Plan of Port of Barcelona on 1195. Var. 12° 30′ W.

long, 175 yards broad, and has depths of 26 to 31 feet alongside the northern and completed side; Muelle de Poniente or Dique del Oeste, which runs out at right angles to the coast mole, is still under construction, when completed it will be 656 yards long, 175 yards broad, and have depths of 25 to 30 feet alongside (in 1911 the northern side of this mole was completed); Darsena de San Beltran or Ante Puerto occupies the space between Muelle de Barcelona and Muelle de Poniente; the southernmost mole of all, Muelle del Morrot, extends at right angles to the coast mole for a distance of 500 yards, and will, when completed, be 120 yards broad. This mole and Muelle de Poniente will enclose Darsena del Morrot, where there will be accommodation for the largest vessels, and also for those laden with explosives.

All the completed moles are connected with the railway system, furnished with powerful cranes, and lit by electricity.

The outer entrance when completed will be about 2 cables wide.

The inner harbour covers an area of about 115 acres; the outer harbour at present covers about 128 acres, and when the present works are completed it will add another 95 acres, and there will be depths throughout of 20 to 40 feet.

When all the work is completed the port will be, as regards water space, quay space, and appliances for loading, unloading, &c., the largest in the Mediterranean.

Depths.—The depth in the approach to Barcelona is 8 to 20 fathoms; in the outer roadstead 14 to 20 fathoms: in the entrance to the harbour 6 to 9 fathoms; outer harbour 19 to 29 feet; inner harbour 21 to 31 feet.

Pilots are ready to board vessels when the weather admits, and all vessels should employ one; the pilot-house is at the extreme of Muelle del Morrot. The traffic of the port is considerable, and with a fresh wind and little available space, decision and quickness are required in choosing a berth. A steam tug is ready if required to assist vessels into port, and spare anchors and cables are at the disposal of the captain of the port.

All vessels of war are obliged to take a pilot from the Outer basin. *See* also regulations, page 9.

Pratique.—Barcelona is a first-class sanitary station, and here vessels can have hull and cargo disinfected and rats destroyed (*see* also page 9).

HARBOUR LIGHTS.—Dique del Este.—Leading lights (*Lat. 41° 21′ N., Long. 2° 10′ E.*).—At the head of the Dique del Este, from a green iron standard, a *fixed green* rear light is exhibited at an elevation of 59 feet above the sea, and is visible in clear

Plan of Port of Barcelona on 1195. Var. 12° 30′ W.

weather from a distance of 4 miles. A *fixed green* front light, elevated 59 feet above the sea, and visible from a distance of 4 miles, is shown from a green iron standard, situated 105 yards from the preceding, and these lights in line, bearing 27° true, indicate the direction of the extension of the mole.

A topmark, consisting of a disc, painted red and white, has been placed on each of the light-beacons to serve as a daymark.

To enable vessels to avoid the outer end of the Dique del Est extension works, leading lights have been established southward of Monjuich castle.

The front light, situated 3 cables south-westward of Morrot point, is *fixed red*, and elevated 52 feet.

The rear light, situated 410 feet north-westward of the front light, is *fixed red*, and elevated 92 feet.

The structures from which these lights are exhibited are surmounted by discs, painted black and white.

These lights in line lead southward of the outer end of the Dique del Est extension works, and the position of the rear light with reference to the front light will accordingly be altered as the work progresses.

Vessels entering the port should not cross the line of the *fixed green* leading lights on the Dique del Est until southward of the line of the above-mentioned *fixed red* leading lights.

Dique del Oeste (*Lat. 41° 21′ N., Long. 2° 10′ E.*). — A *fixed red* light, shown from a red iron standard, 20 feet in height, at an elevation of 49 feet above the sea, and situated on the mole head, is visible in clear weather from a distance of 4 miles.

Muelle del Morrot. — On the outer extreme of Muelle del Morrot, from a round brick tower surmounting a dwelling, the whole 30 feet high, is exhibited, at an elevation of 61 feet above the sea, an *occulting red* light, which is visible in clear weather from a distance of 12 miles.

Muelle de Cataluña.—A staff, 11 feet in height, at the head of the mole, and moved as the work progresses, exhibits, at an elevation of 20 feet above the sea, a *fixed green* light, which, in clear weather, is visible from a distance of one mile.

A *fixed green* light is also shown from the southern angle of the dock, and another of the same character midway between the previous ones.

Muelle de Barcelona. — At the north-eastern angle of the mole, a *fixed red* light is shown, at an elevation of 20 feet above the sea, from a staff 11 feet in height, and is visible in clear weather from a distance of 3 miles.

General charts 310, 1187, 1, 2158a, 449.

Plan of Port of Barcelona on 1195. Var. 12° 30′ W.

White lights are shown from each corner of the North jetty of the Muelle de Barcelona.

Muelle de España.—A *fixed red* and *green* light is exhibited from the southern corner of this mole that is under construction, and a *fixed green* light near the south-western corner.

Muelle de Baleares.—A *fixed green* light is exhibited near the south-western angle of this mole.

Light-buoy.—A red buoy, marked C.D.E., from which a *green fixed* light is exhibited, marks the end of the submerged portion of the extension works of the Dique del Est. This buoy is moved as the work progresses, and vessels should pass to the westward of it.

Buoys. — The extremity of the extension works of the Dique del Est is also marked by two buoys.

Directions.—A red flag is hoisted at the Harbour master's office when movement in the port is difficult or impossible. When entering the port both anchors should be ready for letting go; and a hawser prepared to send on shore. Sailing vessels, entering during a strong easterly wind, should keep as close as possible to the buoy marking the extension of the Dique del Est, as within the port the wind draws to north-east. For clearing marks on entering the harbour, *see* Harbour lights.

Anchorage (*Lat. 41° 21′ N., Long. 2° 10′ E.*). — Vessels of war lie in the outer harbour, just within the eastern mole; in this part there are depths of from 6 to 7 fathoms. There is room for about five large vessels moored close together, with two anchors ahead, and stern moorings to the mole wall, where there are good anchor rings embedded in the masonry. Hemp hawsers are preferable to wire hawsers or chain cables for sternfasts, as being less liable to snap during strong winds.

Plan 1195, Approach to Port of Barcelona.

Barcelona roads. — Vessels unable to enter the Port of Barcelona may anchor half a mile to the eastward of the rounded arm of Dique del Este. Large vessels will find a good berth in 21 fathoms water, over mud, with the Bull ring bearing about 340° true, and Monjuich watch-tower about 273° true. In this berth a sailing vessel is in a good position to weather the shallow ground off the mouth of the Llobregat, in the event of an easterly gale, and has room to get under way should it blow hard from the southward.

In fine weather vessels sometimes take temporary anchorage southward of the entrance of the port, but as the main drain of the town discharges under Mount Monjuich, this is scarcely a pleasant anchorage, especially during summer.

In winter Barcelona road is a dangerous anchorage. Winds from N.E. to S.E. are accompanied, at this time of the year, with rain,

Plan 1195, Approach to Port of Barcelona. Var. 12° 30′ W.

and send in a heavy sea: but when the weather is fine N.W. winds are frequent, and at times blow strong. Southerly gales, though not frequent, cause much damage in the road and port; but both are somewhat sheltered, should the wind be westward of S.W.

Easterly winds generally, but especially at night, set in at N.E., when the roadstead is easily left, but should a sailing vessel wait until it freshens and shifts to the S.E., as frequently happens in winter, it may be difficult to weather the mouth of the Llobregat, as in addition to the heavy sea, there is generally a lee current. In this case it would be prudent to make the vessel snug and trust to the anchors.

During summer, at daylight, when the weather is fine, the land wind is almost always blowing, and continues till 8 or 9h. a.m., and sailing vessels generally leave the port with this land wind.

Chart 310, Cape Tortosa to Cape St. Sebastian.

Directions. — A sailing vessel bound for Barcelona roads, with a strong breeze from the eastward, should keep in the offing until the weather becomes fine, or seek shelter in Salou road (*see* page 210).

The position of Barcelona is readily known by the waterworks, which have a tower 170 feet in height, and stand on the summit of Tibidabo hill; the whole structure is painted white, and may be seen from a distance of 30 miles. The fortifications of Monjuich will also be observed, and on a near approach the city, from its large extent, is distinguishable; Columbus monument and the Custom-house are also good marks, as is also a conspicuous tower, shaped like a minaret, situated close to Barceloneta gas works. An observatory is in course of construction on the south face of Tibidabo hill, about 120 feet below the summit.

For a long distant mark, if the land be clear, Monte Monserrat will indicate its locality: and if from the eastward the remarkable Sierra del Montseny (Matagalls) from its elevation and form, is easily known. (*See* views, page 215.) Fort Mongat, 6½ miles north-eastward of the town, and visible 15 miles, is also a useful mark; there is a telegraph tower at Mongat point.

Plan of Port of Barcelona on 1195.

CITY (*Lat. 41° 22′ N., Long. 2° 10′ E.*). — The city of Barcelona (Barcino of the Carthaginians) lies at the termination of the northern slope of Monjuich, and on the plain which is of considerable extent; it is one of the handsomest and most flourishing cities in Spain.

In addition to the castle of Monjuich and other defensive works, the city was surrounded by massive walls, connected with a citadel upon the north-east; these latter, in consequence of the increase of the population, have been demolished, and a handsome suburb now takes

Plan of Port of Barcelona on 1195. Var. 12° 30′ W.

their place. There is an arsenal on the western side of the harbour, and by Columbus monument, facing which is the saluting battery.

Barcelona contains, besides the palaces of the governor and bishop, a cathedral and many churches, a university, several colleges, schools of artillery and of medicine, libraries, various other institutions, botanic gardens, and several beautiful fountains. The city is divided into two parts by a broad promenade planted with trees named the Rambla, and in the year 1910 the population was estimated at 560,000. A British Consul-General and a Vice-Consul reside here.

The most considerable suburb of Barcelona is Barceloneta, standing on the beach northward of the port, the principal front facing the west, and extending nearly parallel to the mole; and about 4 miles northward of the city on a range of hills, the highest of which is named Tibidabo, 1,200 feet above the level of the sea, summer residences are being built.

Communication.—Thirty-five steamship companies make Barcelona a port of call, and there is a communication by steam vessels with Port Mahon, the Ebro, Tarragona, Cadiz, Marseille, London, and Liverpool. Weekly steamers to Trieste and Valencia, and a monthly service to Alexandria. Barcelona is connected by rail with Madrid, 315 miles distant; Valencia, 194 miles; also with the ports round the northern coast, and with other lines into the interior. A railway is in course of construction to connect Barcelona with Manresa, a manufacturing town, distant about 40 miles, and thence with the Berga coal mines. An electric tramway from the northern end of the city up the mountain of Tibidabo is gradually being constructed. The principal stations are the Eastern station, near the head of the port, the North station, about three-quarters of a mile distant from it, and the Villanueva or Western station, near the coal wharf. Telegraphic communication with all parts. The telegraph office is always open.

Barcelona is connected with Palma, Majorca, by submarine cable.

There is a wireless telegraph station near Llobregat point. *See* page 215.

Coal and supplies. — About 10,000 tons of coal and patent fuel are usually kept in stock, and vessels are coaled by lighters, of which there are 240, of 30 tons, at the rate of from 400 to 500 tons in 8 hours if coaling from the hulks, of which there are two moored on the south side of Muelle de Barcelona, or 300 tons if coaling from the shore. Easterly gales prevent or impede coaling. A coal wharf,

Plan of Port of Barcelona on 1195. Var. 12° 30′ W.

Muelle de San Beltran, 1,500 feet in length, has depths of from 19 to 28 feet alongside; it is supplied with cranes and three coal transporters.

Provisions and other supplies are in abundance, and good water may be obtained at the various quays, and vessels at anchor by a steam tank vessel, but the water is unfit for fine-tube boilers without filtering, and the water supply generally to the town is deficient.

Dock and patent slip. — There is a depositing dock, a patent slip, and a gridiron. For particulars, *see* Appendix I.

Landing place. — The principal landing place is in Darsena Nacional, opposite the Columbus Monument.

Life-saving apparatus.—There is a lifeboat and rocket apparatus at Barcelona.

Repairs. — Large repairs to machinery can be executed at the Arsenal Civil where a steel gunboat has been built; there are also three firms where large repairs can be effected. One floating crane will lift 80 tons, and two 25 tons; 17 fixed hydraulic cranes lift 25 tons, besides several smaller cranes.

Trade. — The exports consist chiefly of wines, olive oil, hemp, sandals, corks, animal refuse, cotton goods, pottery, and porcelain, and the imports of cotton, coal and coke, cereals, manures, mineral waters, metals, oil seeds, and timber. In 1910 the amount of coal, coke, and patent fuel imported was 842,023 tons.

Shipping. — In 1910, 1,584 steam vessels with a total tonnage of 2,509,279 tons entered the port, and 132 sailing vessels with a total tonnage of 44,731 tons.

Seaman's institute. — There is a seaman's institute available for seamen of all nationalities, which is under the direction of the chaplain and of the reader, who resides at the institute. Nearly 4,000 seamen made use of this home in 1910.

Winds and weather.—*See* Meteorological table in Appendix III.

Rio Besós (*Lat. 41° 25′ N., Long. 2° 14′ E.*). — The mouth of this river, 3½ miles north-eastward of Barcelona, is frequently dry, but is occasionally swollen by strong freshes; the sand and silt then brought down is swept to the westward, and is a considerable obstruction to the port of Barcelona. A shoal with but little water on it, extends 2 cables from the mouth of the river.

Chart 310, Cape Tortosa to Cape St. Sebastian.

Badalona.—The town of Badalona, with a population of 19,000, is situated 4½ miles north-east of Barcelona.

Communication.—Badalona has railway communication with Barcelona, also telegraphic communication.

General charts 1187, 2158a, 449.

Plan of Masnou on 1222. Var. 12° 20′ W.

Masnou.—Los Colls shoal.—Masnou is 8½ miles north-eastward of Barcelona, and the town extends eastward about three-quarters of a mile. A sandy shoal, named Los Colls, with from 3¼ to 4 fathoms water over it, and steep-to, begins off the eastern part of Masnou, and is about half a mile from the shore.

With strong winds from the south-east the sea breaks heavily on the shoal, and several vessels have been lost on it. To pass outside Los Colls shoal give the land a berth of a mile, and do not shoal the water to less than 8 fathoms.

Buoy. — A buoy is moored near the edge of the shoal, about 6 cables southward of the east end of the town of Masnou.

Chart 310, Cape Tortosa to Cape St. Sebastian.

Coast. — Between Masnou and Mataró are the towns of Premia and Vilasar, with populations of 1,808 and 3,020 respectively, and both having railway communication. The coast bank extends outwards from Los Colls; and off Cabrera point, between Vilasar and Mataró, the 10-fathoms line is nearly 2 miles from the coast.

Tunny fishery.—Tunny nets are laid out during the season, 1st February to 30th October, off the town of Vilasar. For Lights, marks, and caution, *see* page 73.

Plan of Mataró on 1222.

MATARÓ (*Lat. 41° 32′ N., Long. 2° 27′ E.*). — The town of Mataró (ancient Illuro) stands on the beach 7 miles north-eastward of Masnou, and contains a population of about 20,000. The more ancient or Moorish portion of the town stands on a slight eminence, at a short distance from the coast, and is surrounded by walls; its streets are narrow and crooked, with the exception of the Riera, which is wide and straight, lined with rows of trees, and forming an agreeable promenade. The new town Arrabal de Mataró stretches eastward along the coast, and is larger and more regularly built, with wide streets; woollen, flax, hemp, cotton, and silk goods are manufactured. Two forts on the beach form the defensive works.

Niñ-Armat Grande (Nini-Armat Grande). — A rocky bed with 3¾ and 4¾ fathoms water over it, lies with Mataró church bearing 336° true, distant one mile.

Buoy. — A red and white conical-shaped buoy, surmounted by a globe, marks the south-eastern edge of the shoal.

Anchorage. — Large vessels should anchor a mile south of the town in 10 fathoms water, over sand; within this distance the bottom is rocky and foul.

General charts 1187, 2158a, 449.

Plan of Mataró on 1222. Var. 12° 20′ W.

Communication. — There is railway communication with Barcelona and Empalme junction; also telegraphic communication.

Supplies.—Fresh provisions and water may be obtained.

Chart 310, Cape Tortosa to Cape San Sebastian.

Calella.—The town of Calella, with a population of about 3,300, is situated 10 miles eastward of Mataró, and between lie the towns of Arenys de Mar and Canet de Mar, with populations of 4,450 and 3,300 respectively; boat-building and sea-fishing is the industry at these places. Shoal water extends off this coast for a distance of about half a mile.

LIGHT (*Lat. 41° 36′ N., Long. 2° 39′ E.*). — On Toreta hill, half a mile westward of the town of Calella, and 57 yards inland, a white circular tower and dwelling 35 feet in height exhibits, at an elevation of 174 feet above the sea, a *fixed* and *flashing white* light *every two minutes;* which shows *fixed for seventy-six seconds;* it is eclipsed for *twenty-two seconds*, and shows a *flash* for *twenty-two seconds*, and is visible in clear weather from a distance of 18 miles.

Communication. — Arenys de Mar, Canet de Mar, and Calella have railway communication with Barcelona and Empalme junction on the main line between Barcelona and France; they have also telegraphic communication.

Tordera point, where the river of the same name flows into the sea, lies 6 miles eastward of Calella. At 1½ miles westward of the point is the town of Malgrat or Vilanova de Palafolls, with a population of 3,736. Palafolls castle, on a hill 545 feet high, lies about 2 miles northward of the town. *See* view, page 215.

Santa Susana bank, formed by the freshes of the Rio Tordera and other streams, commences at the western point of the river and extends as far westward as the town of Calella, forming a danger on which the sea breaks in some parts at fully half a mile from the land.

Plan of Blanes bay on 1391.

Blanes bay, situated 1½ miles north-east of Tordera point, is a small bay, between La Palomera on the west, and San Miguel point on the east. Close to San Miguel point are several islets, and on the south-west side is Santa Ana shoal, with about 7 feet water over it, which should be carefully avoided; the bay is shallow along the shore, and there are depths of from 4 to 6 fathoms, over sandy bottom, between the points.

Anchorage. — During westerly winds, in summer, vessels may anchor in Blanes bay, but in winter the south-easterly winds are

Plan of Blanes bay on 1391. Var. 12° 10′ W.

violent, and blow directly on shore. A berth may be taken anywhere eastward of Tordera point, as the bottom is clean, but the most convenient anchorage is about 3 cables south-eastward of the town, in 7½ or 8 fathoms water, over sand.

Town (*Lat. 41° 41′ N., Long. 2° 48′ E.*).—The town of Blanes has a population of about 5,000. Blanes castle, on a hill 541 feet high, lies about a quarter of a mile northward of the town. *See* view, page 215.

Communication.—There is railway communication with Barcelona and France; also telegraphic communication.

Supplies.—Fresh provisions and water may be obtained.

Life-saving apparatus.—A rocket apparatus is stationed at Blanes.

Plan of Lloret bay on 1391.

Lloret bay.—From Santa Ana point the coast gradually becomes high and steep, and trends in an easterly direction for 3 miles to Lloret bay, a small indentation of the coast, on the western point of which is a hill, with an old and conspicuous fortress. The town of Lloret has a population of 3,230, and fresh provisions and water may be obtained there. Merchant vessels of all sizes are built at Lloret. The bay is exposed from the south-east, and, like Blanes, is only frequented by coasters.

Plan of Tossa anchorage on 1391.

Tossa anchorage lies 4 miles eastward of Lloret. The bay is about 3 cables wide and 2 cables deep, and exposed to south-east winds. The town of Tossa, with about 1,900 inhabitants, lies on the western side. Cape Tossa, 213 feet high, with a castle on it, lies on the southern side, the shore round the cape is bold, there being 6 fathoms of water close to. Palma islet lies off its north-east point, but there is no passage between except for boats. Palma shoal, a rock with 6 feet over it, lies 1¼ cables westward of Palma island and about three-quarters of a cable from the shore.

Anchorage.—The best anchorage is in about 9 fathoms water, over sand, off the south-west end of the beach, from which a sailing vessel would be able to clear the cape with an easterly wind; small vessels may lie nearer in, under the high land of the cape.

Supplies.—Provisions may be procured, and water obtained from wells.

Plan of San Feliu de Guixols anchorage on 1391.

SAN FELIU DE GUIXOLS BAY, 6 miles north-east of Cape Tossa, is 4½ cables wide and 4 cables deep. The land on the west

Plan of San Feliu de Guixols anchorage on 1391. *Var. 12° 10′ W.*

side is 328 feet above the sea, with the chapel of San Telmo and a watch tower on its summit; the east side is also elevated, and terminates the high coast from the westward. The general depths over the bay are 4 to 13 fathoms, the bottom being of sand, mud, and weed.

Harbour works.—A breakwater is in course of construction, extending westward from the east side of the bay; it will have a total length of 580 yards. In 1912 quick progress was being made, nearly 500 yards had been completed, and steamers were able to discharge alongside the quays that had been constructed.

Lights (*Lat. 41° 46′ N., Long. 3° 1′ E.*).—The outer end of this breakwater is marked by buoys and by a *fixed green* light, which are moved seaward as the work progresses. The light is 18 feet above the sea, and is visible from a distance of 5 miles.

Two *fixed red* leading lights have been established near the shore in the town, they are exhibited from ordinary posts; the front light is 27 feet above the sea, and the rear light 49 feet above the sea, both lights are visible in clear weather from a distance of 2 miles.

The lights in line bearing approximately 0° true, lead into the harbour clear of the breakwater under construction.

The light-posts are each surmounted by discs with black and white bands for use as daymarks.

A *fixed white* light, exhibited from the roof of a cottage, in line with a *fixed red* light, exhibited from a lamp-post on the northern side of the bay marks the anchorage; these lights are private.

Anchorage.—Vessels should anchor inside the breakwater, as there it is now regarded as safe, in heavy weather.

The bay is exposed to south-easterly and southerly winds, which are the most dangerous in autumn and winter.

Town.—The town of San Feliu de Guixols lies at the head of the bay on a fertile and pleasant plain with a sandy beach; it contains about 14,500 inhabitants; a British Vice-Consul is resident.

Communication.—Steamship communication twice weekly with Cette and Marseille; weekly with Nice and Genoa; fortnightly with Lisbon and Hamburg, and monthly with New York. Railway communication with Gerona on the main line between Barcelona and France; telegraphic communication.

Supplies.—Fresh provisions, all other ordinary necessaries, and water may be obtained at San Feliu de Guixols in abundance; it is one of the best supplied towns in Catalonia.

Life-saving apparatus.—A rocket apparatus is stationed at San Feliu de Guixols.

General charts 310, 1187, 1780, 2158a, 449.

Plan of San Feliu de Guixols anchorage on 1391. Var. 12° 10′ W.

Trade.—The principal trade is the importation of cork wood, and the exportation of corks ready made; the residue, cuttings, shavings, &c., are exported principally for packing purposes. This industry is in a depressed state, caused by the employment of crown stoppers. The imports consist of coals, wood pulp, and timber.

Shipping. — In 1910, 325 steam vessels, with a total tonnage of 200,279 tons, entered the port, and 103 sailing vessels with a total tonnage of 7,088 tons.

Chart 310, Cape Tortosa to Cape San Sebastian.

La Llosa, a rock, with one foot water over it, lies to the eastward of Concas cove, about 2 cables from the shore and 2 miles north-east of San Feliu de Guixols; the sea always breaks on the rock

Beacon.—La Llosa is marked by a beacon consisting of a tower of masonry, 17 feet above the sea, and somewhat conical in shape. It is painted black and white, in horizontal stripes, and has the name of the shoal in black letters on the upper white band.

Plan of Palamos anchorage on 1391.

PALAMOS. — In the bend of the coast, 5 miles northward of San Feliu de Guixols, formed between the tower of Valentina and Molino point, is Palamos anchorage, which affords the best shelter from north-east winds on this part of the coast, and also to coasters from southerly winds, and except for San Feliu de Guixols, is the only safe anchorage between Barcelona and Rosas. Westerly and south-westerly winds send a considerable sea into the harbour, but the north-westerly wind, though off the land, is most severely felt.

Molino point is a mass of rock of moderate elevation, projecting southward, close off which is a small islet named Galera, bold on the outside but skirted by rocks on the land side.

LIGHT (*Lat. 41° 50′ N., Long. 3° 8′ E.*). — On Molino point, a yellow hexagonal stone tower, 27 feet in height, exhibits a *fixed red* light at an elevation of 74 feet above the sea, which is visible in clear weather from a distance of 6 miles. For arc of visibility, *see* Light list and charts.

Molino point shoal (Pera Griu), about a cable westward from Molino point, has 3 feet least water over it; other rocks extend from the shore within it.

Los Aucelles, a detached bank with 8 fathoms over it, lies about 1¼ cables southward of Molino point shoal.

Buoy. — A red can buoy, surmounted by a vane, is moored in a depth of 5 fathoms, on the north-western edge of Molino point shoal.

General charts 1187, 1780, 2158a, 449.

Plan of Palamos anchorage on 1391. Var. 12° 10′ W.

Palamos shoal (La Llosa), lying half a mile south-westward of Molino point, is rocky, about 90 yards in extent, and has 11 feet water over it and from 5 to 8 fathoms close to. Vessels may pass between the rock and shore by rounding Molino point at the distance of a quarter of a mile, in from 12 to 14 fathoms. Cape Gros, open of Galera islet, bearing 48° true, will lead to the south-eastward of the shoal.

Refuge bell-buoy.—Palamos shoal is marked by a refuge buoy, with black and red bands, surmounted by a tripod, at the apex of which is a bell, and underneath the bell a lead-coloured rescue chamber; it is moored in a depth of 6 fathoms north-westward of the shoal. This buoy is liable to be washed away.

Harbour.—Mole.—From the southern part of the town a small mole extends westward about 350 yards, and affords shelter to the northward of it in from 2 to 3 fathoms water.

LIGHT (*Lat. 41° 50′ N., Long. 3° 7′ E.*).—From a metal column with a green hut, 23 feet in height, and situated on the centre of the molehead, a *fixed white* light is exhibited at an elevation of 31 feet above the sea; it is visible in clear weather from a distance of 10 miles. A *fixed green* light is shown from the north corner of the mole.

Breakwater.—A breakwater is in course of construction, commencing at a point on the shore three-quarters of a cable northward of the lighthouse on Molino point; it will extend in a westerly direction for a distance of 765 yards, of which 546 yards have been completed.

Light.—The outer extremity of this breakwater is marked by a *fixed green* light, 8 feet high, which is moved as the work progresses.

Buoy.—A red conical buoy marks the limit up to which the foundations of the breakwater are laid; vessels entering or leaving the port must pass westward of this buoy.

Anchorage.—Large vessels should anchor inside the breakwater south-westward of the mole in 9 fathoms water, with Molino point lighthouse bearing 112° true, and the mole lighthouse 50° true.

Town.—The town of Palamos, containing about 4,000 inhabitants, stands on the western slope of the land forming Molino point, and carries on a small foreign and coast trade: a British Vice-Consul is resident.

Communication.—Railway communication with Flassa on the main line between Barcelona and France; telegraphic communication.

General charts 310, 1187, 1780, 2158a, 449.

Plan of Palamos anchorage on 1391. Var. 12° 10′ W.

Coal.—About 500 tons of coal are kept in stock, and 300 tons could be put on board in 24 hours; there are 12 lighters.

Water can be obtained from a stream on the sandy shore, north of the town.

Life-saving apparatus.—A lifeboat and rocket apparatus are stationed at Palamos.

Trade.—The principal exports are corks and cork shavings, bricks, and bark for tanning, and imports coals, lime and cement, and cork-wood.

Shipping. — In 1910, 78 steam vessels, with a total tonnage of 103,157 tons, entered the port, and 2 sailing vessels, with a total tonnage of 174 tons.

Cape Gros, high and rugged, lies about one mile north-eastward of Molino point. Midway between these two points lies Monte del Padro, a rock with 4½ fathoms over it, and 2½ cables from the coast.

Chart 1804, Cape San Sebastian to Cette.

HORMIGAS ROCKS (*Lat. 41° 51′ N., Long. 3° 11′ E.*), lying 3 miles north-eastward of Molino point, and 7 cables eastward of Canes point, which is the next point eastward from Castell point, are small islets; Hormiga grande, the largest, is 30 feet above the sea. The southern islet lies 2$\frac{2}{10}$ miles, bearing 197° true, from Cape San Sebastian lighthouse, and the eastern is 1$\frac{3}{10}$ miles eastward of Castell point.

Furio rock, a small flat rock with foul ground all round it, lies 2½ cables eastward of Canes point and Plane island or Planas rocks; another small flat rock lies half a mile north-westward of the Hormigas and close to Termino point on the mainland. Two dangerous rocks lie off the Hormigas: Nerera rock with 4 fathoms water over it, about 2 cables southward, and Sardana rock with 4¼ fathoms over it, about 2½ cables northward of Hormiga grande.

The channel between Hormigas rocks and the mainland is not recommended to vessels without local knowledge, but should it be necessary to use it, pass midway between Plana island and the Hormigas, giving a berth of 2 cables to Plana island and 1½ cables to Furio rock and the Hormigas.

Cala Calella lies 1¼ miles northward of Plana island; the village of Calella lies at the head, and a ruined tower on its eastern point. Coasters use this cove, but it is open, like others on this part of the coast, to the south-eastward. The coast between Plana island and Cala Calella is much broken, rocky and foul.

Cape San Sebastian, 2½ miles to the north-eastward of Castell point, is high, with a chapel, lighthouse, and other buildings on it.

General charts 310, 1780, 2158a, 449.

Chart 1804, Cape San Sebastian to Cette. Var. 12° 10′ W.

LIGHT (*Lat. 41° 54′ N., Long. 3° 12′ E.*).—A red circular tower, 40 feet in height, and situated near the hermitage on Cape San Sebastian, exhibits, at an elevation of 548 feet above the sea, a *fixed* and *flashing white* light *every forty-eight seconds*, the duration of each *flash* being *six seconds*. The *fixed* light is visible in clear weather from a distance of 19 miles, and the *flashing* 31 miles, but at 15 miles distance and in misty weather the *fixed* light is not generally seen.

Los Ullastres, a shoal with three rocky heads, on which the least water is 4½ fathoms, lies 4 cables southward of Cape San Sebastian.

Cape Bagur (*see* view B on chart) lies 3¾ miles northward of Cape San Sebastian, and between are four small coves, named Pedrosa, Tamariu, Esclana, and Blanca; Bagur is a large village about a mile westward of the cape.

Signal station. — Semaphore. — On a steep rock about 1½ cables south-west of Cape Bagur, there is a semaphore, at an elevation of 354 feet above the sea, which will receive messages by signal from passing vessels and transmit the same by telegraph.

Cala Tuna lies about a mile northward of Cape Bagur and between Palom and Sal points; it affords anchorage in from 9 to 10 fathoms, sand, sheltered from westerly winds round to south.

Cala Riereta lies about a mile north-westward of Sal point. Coasters take shelter here but must guard against Baix rock in the entrance, which has only 1½ feet over it.

About half a mile north-westward of Cala Riereta are Rincon rocks where the beach of Pals commences and runs for 4½ miles to the northward and having the entrances to the Rios Daro and Ter through it. Pals tower is on some slightly raised sand dunes near the coast and close to Rincon rocks. The town of Pals lies about 3 miles inland.

In front of Pals beach, especially near the mouths of the two rivers, shoal water extends for some distance, varying according to the floods; vessels should not approach this coast nearer than a distance of half a mile.

Plan of Meda islands anchorage on 1391.

MEDA ISLANDS. — The Meda del Estardi, off the northern end of Pals beach, is a group of high islands extending for a distance of 7 cables in a north-westerly and south-easterly direction; they consist of three principal islands and some smaller ones and rocks; the north-west island named Meda is the largest, 249 feet above the sea, nearly square, about 2 cables across, and has some batteries on it. Mogote Bernat, the south-east islet, is

General charts 1780, 2158a, 449.

Plan of Meda islands anchorage on 1391. Var. 12° 10′ W.

a high rock 236 feet above the sea, shaped like a pyramid, nearly circular, and about half a cable in diameter. Meda Chica islet, between these, is of irregular shape, and 220 feet above the sea. El Magallot, the northernmost islet, is 79 feet high, and lies 1½ cables from Meda island. There are depths of 10 to 17 fathoms between them.

The north-west point of Meda island is 4½ cables distant from Guixeras point, the nearest part of the coast; in mid-channel there are from 9 to 13 fathoms water, and any vessel may use the passage.

LIGHT (*Lat. 42° 3′ N., Long. 3° 13′ E.*). — On the highest part of the north-west Meda island a *fixed white* light is exhibited at an elevation of 283 feet above the sea, from a red and blue square tower 35 feet in height surmounting a dwelling; it is visible in clear weather, from a distance of 18 miles.

Anchorage may be obtained off Beseta point, south-westward of Meda island, at about two-thirds of a cable from the shore in depths of from 6 to 10 fathoms.

Chart 1804, Cape San Sebastian to Cette.

Gulf of Rosas, between Mila point (which is 3 miles north-westward of Guixeras point) to the south-west and Cape Norfeo to the north-east, is about 8½ miles across and 5½ deep (*see* view B on chart). In the middle of the entrance there are about 35 fathoms water, which depth gradually decreases to the shore. The nature of the bottom is mud or muddy sand, except near the capes, where it is rocky. The bay is much resorted to by sailing vessels bound to Marseille, Toulon, and other ports in the Gulf of Lyons when unable to make way against strong north-easterly winds.

Cala de la Clota, in the southern part of the gulf, affords but little shelter, and is suitable only for small vessels.

La Escala, a town with about 2,600 inhabitants, principally employed in coral fishery, is situated north-westward of Cala de la Clota.

Life-saving apparatus.—A rocket apparatus is stationed at La Escala near the north side of Cala de la Clota.

Plan of Rosas bay on 1615.

ROSAS BAY, in the northern part of the gulf of the same name, forms an extensive anchorage, nearly 2 miles across in an east and west direction, and nearly a mile deep, with from 5 to 8 fathoms water. On the eastern side the land is high.

LIGHTS. — On Ponsella point, at the east side of the anchorage

Plan of Rosas bay on 1615. Var. 12° 10′ W.

of Rosas, is a white circular tower, 37 feet in height, which exhibits, at an elevation of 78 feet above the sea, an *alternating fixed* and *flashing* light showing *fixed white* with a *red flash every two minutes;* it is visible in clear weather from a distance of 14 miles.

A *fixed green* light is exhibited at an elevation of 11 feet above the sea, from the end of the South mole; it is visible in clear weather from a distance of about 2 miles.

Moles.—Two moles are constructed on the eastern side of the bay. The Northern or Commercial mole lies about 3 cables southward of the town, it extends in a westerly direction, is 328 yards long, and 55 yards wide; there are three landing places on the north and south sides, and one at the outer end. On the northern side there is very little water for a distance of about 100 yards from the shore.

The southern or Muelle Abrigo lies about 2½ cables southward of the Commercial mole, it extends in the same directions and is 400 yards long and 9 yards wide. There are four landing places on the north side, the inner one is shallow, but the others have depths of 2 to 6 fathoms alongside. There are bollards on the north side for securing stern hawsers. Boats should be careful going alongside this mole as it projects for about 2 feet below the surface of the water.

Anchorage (*Lat. 42° 14′ N., Long. 3° 10′ E.*).—The anchorage of Rosas is exposed to southerly winds which blow directly into it, but they are not frequent; south-east winds, however, are common, and the outer anchorage is partly exposed to them. If a northerly or north-westerly wind prevails in the Gulf of Lyons the wind in Rosas bay blows with great violence. A heavy sea does not reach the anchorage, and the bottom being mud or muddy sand, and near the shore, sand with patches of long weed, with good anchors and cables there is no danger.

A good berth for a large vessel is in 9 fathoms water, with the end of the Commercial mole bearing 45° true, and the lighthouse on Ponsella point bearing 133° true. Small vessels generally anchor in about 3 fathoms water, over sandy bottom, abreast the suburb, about 2 cables from the shore; but to be well sheltered from south-easterly winds, anchorage should be taken up near the eastern shore.

During winter a sailing vessel off Cape Creus, meeting with strong winds from the Gulf of Lyons, or even from the eastward, will do well to take advantage of the anchorage of Rosas; and it would be equally prudent for a vessel off Cape San Sebastian bound westward with strong south-westerly winds to seek shelter at the same anchorage, in order to save the wear and tear which otherwise must inevitably take place, without gaining ground.

General charts 1804, 1780, 2158a, 449.

Plan of Rosas bay on 1615. Var. 12° 10′ W.

Town.—On the beach at the head of the bay is the town of Rosas with about 2,600 inhabitants. The citadel (in ruins) lies northward of the town; a row of trees hides it from seaward.

Landing.—There are two light wooden landing stages off the town which small boats can use. Steamboats can approach them within 10 yards.

Supplies of all kinds are to be obtained, and water can be procured from a stream on the west side of the ruined fortress.

Life-saving apparatus.—A lifeboat is stationed at Rosas.

Coast.—Cape Falcó, the southern and most salient part of which is Falconera point, is 2 miles eastward of Ponsella point, the coast between being high, with two coves named Little and Great Cañellas bays respectively; Cañellas rocks, a small cluster about a cable in extent, lie 3 cables southward of Little Cañellas bay, with depths of 8 to 10 fathoms inside them.

Tunny fishery. — Tunny nets are sometimes laid out 2 cables southward of Great Cañellas point during the season, 1st February to 30th October; the nets extend nearly 2 cables south-westward of Great Cañellas point. For Lights, marks, and caution, *see* page 73.

Chart 1804, Cape San Sebastian to Cette.

Cape Norfeo (*Lat. 42° 14′ N., Long. 3° 16′ E.*), situated nearly 2 miles eastward of Cape Falcó, is a broad headland, high, bold, and steep-to, with an islet at its south-east point. It is the north-east extreme of Rosas gulf, and the termination of a peninsula, on the west side of which an inlet, a mile deep, contains two coves with a little beach, but here the bottom is rocky. *See* view B on chart.

Cala de Jonculls, on the north side of Cape Norfeo, between it and Figuera point, is clear of danger and at times resorted to by coasters for shelter from north-east winds; the coast of the bay is composed of cliffs, and the water is deep.

Plan of Port Cadaqués on 1615.

PORT CADAQUÉS is about 5 cables wide at the entrance, and three-quarters of a mile deep in a north-westerly direction, with from 5 to 20 fathoms water, over a bottom of stiff mud and weed.

Cala Naus point, 2½ miles northward of Cape Norfeo, is the southern extreme of Port Cadaqués; about 6 cables northward of Cala Naus point is Cala Conca point, with a small round conical hill over it, which appears like an island. The western shore of Port Cadaqués is high and steep.

General charts 1780, 2158a, 449.

Plan of Port Cadaqués on 1615. Var. 12° W

LIGHT (*Lat. 42° 16' N., Long. 3° 17' E.*).—On Cala Naus point, and about 30 yards from the sea, a *fixed white* light is exhibited from a white circular tower on a yellow house, 24 feet in height; the light is exhibited at an elevation of 125 feet above the sea, and is visible in clear weather from a distance of 10 miles.

Arenella island, on the north-east side of the entrance, has a tower on its northern end. Devesa bank a rocky reef, extends a cable to the southward of the island; it has 2 fathoms water on it and 13 fathoms close-to, seaward.

About a cable south-west of Arenella island are El Berganti and El Cucurucu islets, the latter with 5 fathoms water at less than half a cable westward of it; the channel between these islands and Arenella is foul.

The northern shore of Port Cadaqués is low and broken.

El Pilo rocks, lying 2 cables north-westward of El Cucurucu islet, are three rocks above water, extending, with a fringing shoal, over about a cable in a north-westerly and south-easterly direction. These rocks with Cala Conca point form the narrowest part of the channel, which is 2 cables in width, and has a depth of 12 fathoms in mid-channel.

Beacon.—A beacon, with ball topmark, is situated on the north-western of these rocks.

La Entina, a rocky shoal, a third of a cable in extent, with 1½ fathoms water over, and 5 to 7 fathoms around it, lies one cable northward of El Sortell, an island close northward of Cala Conca point.

Buoy.—A buoy is moored on the eastern edge of this shoal.

Anchorage.—Large vessels should moor in 10 fathoms with their anchor N.E. and S.W. about a cable eastward of La Entina buoy with the centre of the town bearing about 315° true, and a conspicuous windmill on the north-eastern side of the port bearing 40° true. Small vessels generally anchor in depths of 1½ or 2½ fathoms, over sand, off Playa pool, fronting the north-eastern extreme of the town, where they are safe from all winds, and even from the swell from the eastward, which often reaches the head of the bay. There is another small bay well sheltered northward of El Pilo.

Directions. — Port Cadaqués is frequented by sailing vessels bound to the eastward; when on reaching Cape Creus (which lies 3 miles to the north-eastward), with a westerly wind, they find the wind change to the eastward.

The port may be recognised as lying midway between Cape Creus and Cape Norfeo, and also by the conspicuous Mount Cadaqués lying

General charts 1804, 1780, 2158a, 449.

Plan of Port Cadaqués on 1615. Var. 12° W.

1½ miles westward of Arenella island; the convent of San Pedro de Roda on the summit of the mountain of that name lying 5 miles westward of the town; and the Hermitage of San Sebastian on the summit of a peak about one mile southward of the town. *See* view B on chart 1804.

Close to Cape Creus is Maza de Oro, a small islet, and nearly 2 miles southward of it are a group of islets the largest named Massina; they are all conspicuous. As the wind from the northward is scant for entering the bay, in order to avoid Devesa bank, keep Maza de Oro and Massina islets in line bearing about 26° true until El Pilo beacon is open of El Cucurucu islet, bearing 305° true, when a vessel may stand in, westward of El Cucurucu islet and El Pilo rocks.

Town. — The town of Cadaqués, containing about 1,600 inhabitants, is built partly on high land and partly on the coast at the head of the bay.

Supplies of provisions in small quantities and water may be obtained.

Life-saving apparatus.—A lifeboat is stationed at Cadaqués.

Winds.—The prevailing winds during the greater part of the year are North and N.E., which blow fresh, particularly in autumn and winter; but in all parts of the bay vessels lie in safety. In these seasons also there are occasionally gales from the southward, but at the inner part of the harbour there is nothing to fear, for the south-easterly wind is never known to be violent or of long duration.

Port Lligat (*Lat. 42° 17′ N., Long. 3° 17′ E.*).—Oliguera point, about half a mile north-eastward of El Cucurucu islet, is low and rocky like the intermediate shore. From the point the coast trends northward, for nearly three-quarters of a mile, to Port Lligat, which affords shelter to coasters except during north-easterly winds. The island of the same name, with Fernera islet close to its northern end, lies in the entrance to the cove, and so near the mainland that the southern channel between is scarcely navigable for the smallest vessels.

Massina islets, lying half a mile eastward of Port Lligat island, are two islets of modern height, about half a cable apart, with four bold isolated rocks between. Shoal water extends about half a cable westward of Massina islet, but between it and the mainland there are 25 fathoms water, the bottom being mostly rock.

Cala Guillola, about half a mile northward of Port Lligat island, is a small bay 2 cables wide, and 3 cables deep, open only to the southward and south-eastward, and affording good shelter from the northerly gales which prevail so often on this coast.

General charts 1804, 1780, 2158a, 449.

Plan of Port Cadaqués on 1615. Var. 12° W.

Anchorage in 7 to 8 fathoms water, over bottom of sand or weed, may be found with shelter from all winds except those from the south-eastward.

Chart 1804, Cape San Sebastian to Cette.

CAPE CREUS, the eastern extreme of the coast of Spain, is of moderate elevation, rugged and uneven, and on its north side lies Encalladora or Clavaquera island, also of moderate elevation, with a reef extending about 70 yards from its south-eastern end. *See* view B on chart.

LIGHT (*Lat. 42° 19′ N., Long. 3° 19′ E.*).—From a red and blue circular tower 34 feet high, and situated 550 yards inland from Cape Creus, is exhibited, at an elevation of 279 feet above the sea, a *fixed* and *flashing white* light *every three minutes;* which is visible in clear weather, the *fixed* from a distance of 17 miles, *flashing* 23 miles.

Maza de Oro islet, uneven and of moderate height, and with a reef extending about 70 yards off its north-west side, lies about a third of a mile off the east side of Cape Creus.

The passage between Cape Creus and Encalladora and Maza de Oro islets, has depths of 10 to 12 fathoms in mid-channel, but is very narrow, being not more than half a cable in width in some parts, so that with winds from the northward the sea breaks right across, and it is only available for small vessels, under favourable circumstances.

Cullera and Fullolas islets lie close to the coast and distant half a mile, and one mile respectively, from Encalladora island. De Fuera bank with 5½ fathoms over it lies 3 cables north-westward of Cullera islet, and about 2 cables from the coast, and between De Fuera bank and Cullera islet are two rocky heads with 1½ and 2¾ fathoms over them. Dels Sisternons bank, with 5½ fathoms over it, lies one cable north-westward of the western Fullola islet, and one cable from the coast.

El Golfet, between Farralons point and Cape Gros, is a mile wide, and runs in generally a distance of about half a mile, but Cala Taballera on the south side of the bay runs in for another half mile. In this bay there is good anchorage sheltered from southerly winds, which are frequent in the summer; the bottom is stiff mud, with 25 to 28 fathoms water, decreasing near the shore to 5 fathoms, over rock and gravel. In the south-west angle of the bay there are two islets, Galera and Bergantein, of moderate height. In winter no vessels should anchor in the bay, as it is fully exposed to northerly and easterly winds, which raise a heavy sea.

General charts 1780, 2158a, 449.

Chart 1804, Cape San Sebastian to Cette. Var. 12° W.

Cape Gros, the western extreme of El Golfet, may be known by its elevation and forming several low points with a sudden slope to the sea; the cape terminates in a cliff.

Coast.—One mile westward of Cape Gros and a cable from the coast is Meda islet, conical, and 25 feet high, with several rocks on its shore side, and a rocky bank with 2 fathoms water over it extending 50 yards north-west of it. At 6 cables beyond the islet is La Creu point, a high cliff with a battery on it, and several rocks around it extending for a distance of about 40 yards. Behind La Creu point the land rises to a peak, Carbonera peak, 393 feet high.

Plan of Port Selva on 1615.

Tamarina cove, between La Creu and Mitja points, runs in about 3 cables; between the two points there are depths of 9 to 10 fathoms, and rapidly shoals to the head of the cove. It is sometimes mistaken for Port Selva. This cove is much exposed, should only be resorted to in cases of necessity, and anchorage taken up in more than 15 fathoms water, over gravel and weed. The bottom is chiefly rocky.

PORT SELVA (*Lat. 42° 20′ N., Long. 3° 12′ E.*), formed between La Creu point on the east, and Sernella point on the west, is open to the north and north-east, and about 7 cables broad and the same deep, with soundings shoaling from 17 fathoms at the entrance to 5 fathoms near the head.

The town of Selva is on the east side of the bay, along the beach at the foot of the steep rocks; the population is about 1,800.

LIGHT.—From a tower on a white house, situated on Sernella point, will be exhibited, in 1913, a *white occulting* light, which will be visible from a distance of about 12 miles.

Anchorage.—Northerly and north-westerly winds frequently prevail here and are generally strong, the latter being the most severe although off the land. The best anchorage off the town is in 6 or 7 fathoms water, over a bottom of muddy sand. Small vessels anchor in 3½ fathoms, and large vessels, for temporary purposes, farther out, in 11 and 13 fathoms.

Supplies.—Fresh provisions and water may be obtained.

Life-saving apparatus.—A lifeboat is stationed at Port Selva.

Chart 1804, Cape San Sebastian to Cette.

Monte San Pedro de Roda.—The interior of the whole of this coast is mountainous, and to the southward of Sernella point, about 3 miles inland, is Monte San Pedro de Roda, 2,260 feet high, with castle and convent at the summit, very conspicuous from seaward, and good marks for Port Selva. *See* view B on chart.

General charts 1780, 2158a, 449.

Chart 1804, Cape San Sebastian to Cette. Var. 12° 10′ W.

Cape Lladró.—At 3 miles northward of Sernella point is Cape Lladró, white in colour, with an island and small conical-shaped islet at its point also white. Between it and Cape Ras to the southward is Cala Garvet, open to the eastward, and into which a heavy sea sets with the wind from that quarter.

Anchorage.—Cala Garvet affords good anchorage with off-shore winds; the best berth is in 6 fathoms water, over sand, with the highest islet off Cape Ras in line with the peak over Cape Gros, bearing about 133° true.

Cape Cerbére. — At three-quarters of a mile beyond Cape Lladro is Marce point; between the two is Cala Culera, with a sandy bottom. About half a mile northward of Marce point is Gatillepis point, inside of which is Cala Port Bou, and then follows Cape Falco and Cape Cerbére; the latter has a moderate-sized island off it, and is the termination of a lofty range of mountains forming the boundary between France and Spain. Between Capes Lladro and Cerbére the coast is high and bold, generally clear of danger, with rocky bottom.

Port Bou lies at the head of Cala Port Bou, and is a town with a certain amount of importance as being on the frontier. It has a population of about 2,500.

Communication. — Port Bou and Culera both have railway communication with Barcelona; there is also telegraphic communication.

Boundary.—The boundary between Spain and France is in the bay, north of Cape Falco or Lausiel. Lat. 42° 26′ 05″ N., long. 3° 10′ 18″ E. (approximate).

Tunny fishery.—Tunny nets are laid out during the season, 1st February to 30th October, off Escala point in the approach to Cala Culera; the seaward extremity of the nets is situated with Marce point bearing 340° true, distant 4½ cables, and Cape Lladro bearing 225° true. For Lights, marks, and caution, *see* page 73.

For continuation of this coast, *see* Mediterranean Pilot, Vol. II., Chapter II.

CHAPTER IV.

THE BALEARIC ISLANDS.

(*Lat. 38° 30′ N. to Lat. 40° 10′ N.*)
(*Long. 1° 0′ E. to Long. 4° 30′ E.*)

VARIATION IN 1912—decreasing about 7′ annually.

Chart 1187, Alicante to Palamos, &c. Var. 12° 50′ W.

BALEARIC ISLANDS.—The Balearic islands, consisting of Majorca, Minorca, Iviza, and Formentera, with their outlying islets, lie eastward from Cape Nao. They have a population of about 326,000, and an area of 1,959 square miles. The channel between Cape Nao and Iviza is 46 miles; between Iviza and Majorca 44 miles; and between Majorca and Minorca 20 miles, in width.

Depths.—In the Iviza channel between that island and Cape Nao, the greatest depth is 477 fathoms in mid-channel, decreasing to about 50 fathoms at 5 miles from the cape, and to about 70 fathoms at the same distance from the island; the bottom is principally mud. In this channel, with northerly and north-easterly winds there is generally a considerable sea, and a strong southerly current impeding vessels bound to the northward.

The greatest depth in mid-channel between Iviza and Majorca is 380 fathoms, and the 100-fathoms contour line is distant 8 miles from Iviza and 18 from Majorca; the bottom being generally sandy.

The passage which separates Minorca from Majorca, known as the Freu de Menorca, is connected by a bank, the bottom being sand and mud, and the depth midway about 45 fathoms, increasing to 300 and 400 fathoms north and south. This ridge accounts for the heavy sea experienced in this channel when the wind is blowing hard from the northward.

Chart 3276, Iviza and Formentera islands.

IVIZA (IBIZA) (*Lat. 39° 0′ N., Long. 1° 25′ E.*), the ancient Ebusus, lies 48 miles eastward of Cape San Antonio, is 22 miles in length in a north-easterly and south-westerly direction, about 10 miles in breadth, and has a coastline of 72 miles. The northern coast is high and rocky, but the southern is less elevated, and the surface generally

Chart 3276, Iviza and Formentera islands. Var. 12° 50′ W.

hilly and well wooded; Atalayasa, the highest mountain, near the south-west end of the island, is 1,558 feet high.

In addition to several coves, Port Iviza is situated on the south-east of the island, and Port San Antonio on the north-west side. Corn, flax, and hemp are cultivated in some of the valleys, besides olives and other fruits; the fisheries are important, and salt, locust beans, and charcoal are the chief exports; there are also lead mines on the island.

Cabo Jueu, the south-westerly extreme of Iviza, is high, steep, a little salient, covered with trees, and has a martello tower on it, which is best seen from a south-easterly or south-westerly direction.

Vedrá and Vedranell islets.—Vedrá, lying 1½ miles west of Cabo Jueu, is about three-quarters of a mile in length, in an easterly and westerly direction, rocky, and 1,253 feet high, with a steep rocky coast. It forms two peaks, is of a red colour, and easily recognised, but at a distance is blended with the land. A berth should be given to it with north-westerly winds; landing is difficult.

A rock named La Bota, which is awash, lies north-westward, distant one mile from the north point of Vedrá islet.

Vedranell islet, 410 feet high, lies between Vedrá and Cabo Jueu, and they both appear like the continuation of the cape which extends in a south-west direction. *See* view, page 261.

El Mataret, a shoal, with 4¼ fathoms water over it, and which does not break except with a swell, lies northward distant a third of a mile from the east end of Vedranell islet. A depth of 11 feet was formerly stated to exist on this shoal.

Cape Llentrisca (*Lat. 38° 51′ N., Long. 1° 15′ E.*) is situated 1½ miles south-eastward of Cabo Jueu, and midway between is Mount Llentrisca, 1,358 feet high; its upper part and summit is covered with trees, but bare and white to the water. Cala Llentrisca, eastward of the cape, is a cove with deep water at the entrance, but only from 3½ to 4½ fathoms within; it can only accommodate vessels of moderate size, sheltered from all but south-easterly winds.

Submarine telegraph cable.—A telegraph cable from Javea bay in Spain is landed at Puerto Roig, 2½ miles eastward of Cape Llentrisca.

Punta Yondal, lying 3½ miles eastward of Cape Llentrisca, is low, flat, white, and steep on the west side; a reef lies 1½ cables southward of Punta Yondal.

Anchorage.—The bays on either side of Punta Yondal are clear of danger and afford summer anchorage, open to the southward.

Water may be obtained near the shore.

General charts 1766, 1187, 1, 2158a, 449.

Plan of channels between Iviza and Espalmador on 3276. Var. 12° 40′ W.

Punta Rama is situated 6 miles 103° true from Cape Llentrisca, and southward of it, about a cable distant, are two low islets, with a very small rock about 2 cables to the eastward. Punta Rama is the termination of Cape Falco which is high and steep.

Punta Portas, low and projecting, lies 1½ miles eastward of Punta Rama, and has a tower on it; Caragolé, an islet, 26 feet high, lies 3 cables southward of the point, and 2 cables to the westward of it is a small islet named La Barqueta. Between Punta Portas and Cape Falco is a bay from which salt is embarked, from the salinas, northward of Cape Falco. A buoy for the use of salt vessels is moored in 5 fathoms near the head of the bay.

Ahorcados islet, half a mile southward of Caragolé islet, is about a third of a mile in length in a north and south direction, and 33 feet high; the channel between the islets, named Freo de en medio, is only navigable for small vessels with local knowledge, as shoal water extends from the islets into the channel on both sides.

LIGHT.—On Ahorcados islet, a dark grey conical tower, 53 feet in height, exhibits, at an elevation of 88 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 15 miles. *See* view, page 246.

Negra islets. — North and South Negra islets, 16 and 13 feet high respectively, lie about 3 cables to the westward of Ahorcados; about a quarter of a mile to the southward of the islets is Bajo Ahorcados, a shoal with 2½ fathoms water over it. All these islets appear to be a prolongation to the southward of the island of Iviza, and with Espalmador, to the north of Formentera, form the several channels named Los Freos.

Espalmador islet.—The largest of the islets between Formentera and Iviza may be considered as a continuation of Formentera, for the small channel which separates them is scarcely passable for boats. The islet, 1½ miles in length in a north and south direction, is low and level, its west end steep, with a tower on it. The north end of Espalmador terminates in a low point named Puercos, and off it is an islet of the same name. Espalmador tower, the red cliff on which it stands, the lighthouse of Ahorcados and that of Puercos, serve as marks to indicate the Freo Grande or principal channel between the islands.

LIGHT (*Lat. 38° 48′ N., Long. 1° 26′ E.*). — On the north-west part of Puercos islet, a grey conical tower, 80 feet in height, exhibits, at an elevation of 94 feet above the sea, an *alternating fixed* and *flashing* light, showing *white fixed* with a *red flash every three*

General charts 1766, 1187, 1, 2158a, 449.

Plan of channels between Iviza and Espalmador on 3276. Var. 12°40′ W.
minutes, and is visible in clear weather from a distance of 15 miles. *See* view, page 246.

Bajo Cala Bochs, a rocky shoal, steep-to, with 3½ fathoms water over it, and 10 fathoms close to the eastward and 8 fathoms close westward. From the shoal Puercos lighthouse bears 294° true, and is distant 8 cables.

Espardell islet, rather more than 2 miles eastward of the north part of Espalmador, is about a mile in length, 95 feet above the sea, and flat on the top. Espardelló Tramontana islet, very small, lies about 1¼ cables northward of Espardell islet, and Espardelló islet, about 2 cables in length, lies off its south extreme and is connected to it by a ledge of rocks; shoal water extends nearly a cable southward of Espardelló islet.

Anchorage. — Fair anchorage may be obtained in 14 fathoms water, available in all weathers on the western side of Espardell islet.

LOS FREOS are the channels formed by the islets in the space between the islands of Iviza and Formentera. The channels are three, named Freo Grande, Freo Mediano, and Freo Chico.

Freo Grande (*Lat. 38° 48′ N., Long. 1° 25′ E.*), the most important of the three, from its breadth and depth, is formed by the Negra islets, and Ahorcados on the north, and Puercos islet on the south. It is a mile wide, with 4½ fathoms in mid-channel, and, except on the island sides, this depth apparently extends across the channel in a ridge; but caution is necessary as it does not appear that this channel has been closely sounded; the deepest water is shown on the southern side of mid-channel. The nature of the bottom is weed and rock, with patches of sand, and when the sea is smooth the dark and white spots are clearly seen.

Directions. — A vessel from the westward making for Freo Grande will have, to the northward, the high land of Iviza, and to the southward that of Formentera, with the channel showing between, and on approaching, the light-towers and islets will be recognised; a berth of half a mile should be given to Ahorcados island to avoid Bajo Ahorcados.

The deepest passage over the ridge above mentioned, is on the southern side of mid-channel, about a third of a mile north of Puercos island; but, in a vessel of heavy draught, the state of the sea should be considered: vessels from the eastward generally pass northward of Espardell islet.

A vessel in Valencia bay or Iviza channel, with strong northerly or north-west winds, may run for Los Freos and anchor, choosing a suitable position so as to leave when the wind moderates.

General charts 1766, 1187, 1, 2158a, 449.

Chart 3276 and plan on 3277. Var. 12° 40′ W.

Iviza approach.—Islets in the approach.—In the south approach to Port Iviza are five small rocky islets, the southern of which, named Esponga, is a small, flat, round islet, which lies 3½ miles northward of Ahorcados lighthouse.

About two-thirds of a mile beyond it, in a north-easterly direction, is South Malvin islet, 65 feet above the sea, and larger and higher than the former, having off its north-eastern end two rocks, and a shoal, on which the least water is 1¼ fathoms, extending for the distance of a cable off its north end.

North Malvin, situated 3 cables north-eastward of South Malvin, is 39 feet above the sea, and has two small rocks off its north end.

The *red* sector of Botafoch light shows over these three islands.

Bajo d'els Malvins, a shoal with 4½ fathoms water over weed, lies 4 cables westward from South Malvin.

Dado Grande and Dado Pequeño, two small islets, are situated 6 and 7 cables respectively to the eastward of North Malvin; Dado Grande is 42 feet above the sea; Dado Pequeño has a shoal with about 3 feet water over it, lying a cable on its north side; the sea generally breaks on this shoal.

Plan of Port Iviza on 3277.

PORT IVIZA.—The land, from the citadel of Iviza, slopes south-eastward nearly 2 cables to Punta Retjada, which is situated about 5 miles north-eastward of Portas tower, and about 6 cables eastward of Punta Retjada is Grossa island, 138 feet above the sea, with an islet close to its western side named Botafoch; between this islet and Punta Retjada is the entrance to the port of Iviza, an indentation of the coast about 7 cables deep, open to the southward.

To the northward of Grossa island, and connected to it by a narrow neck named Es Freuet, is Plana island, 65 feet above the sea; also connected to the main by a low neck of land covered with rushes.

Moles.—A mole extends from the western entrance point in a north-easterly direction for a distance of 186 yards, and 1½ cables to the westward there is another mole, about 60 yards in length in a north-easterly direction.

Depths.—There are depths of about 3¾ fathoms in places inside the moles, and depths of 7 to 8 fathoms in the anchorage.

LIGHTS (*Lat. 38° 54′ N., Long. 1° 28′ E.*).—On Botafoch islet, on the east side of entrance to Port Iviza, a grey stone tower, with a white cupola, 68 feet in height, exhibits, at an elevation of 120 feet above the sea, an *occulting* light, with *white* and *red* sectors *every six and seven-tenths seconds*, thus:—light, *five seconds;* eclipse, *one and*

General charts 1766, 1187, 1, 2158a, 149.

Plan of Port Iviza on 3277. Var. 12° 40′ W.

seven-tenths seconds. The light is visible in clear weather from a distance of 10 miles. For sectors, *see* Light list and chart.

A *fixed green* light is shown at an elevation of 15 feet above the sea, from a red post, 11 feet in height, on the outer end of the eastern mole, and is visible in clear weather from a distance of 4 miles.

Buoy.—A red and white buoy marks the extremity of shoal water off the eastern mole.

Anchorage (*Lat. 38° 53′ N., Long. 1° 27′ E.*).—Anchorage, in 7 or 8 fathoms water, should be taken up rather nearer to Plana island than towards the town, so as to be better sheltered from easterly winds. In winter, as previously remarked, northerly and north-westerly winds are prevalent and strong.

As the head of the bay is very shallow, vessels should not pass northward of an imaginary line drawn in an easterly and westerly direction, from a white mark about 2 cables northward of the citadel, and a mark on Plana island; this line passes about one cable northward of the extreme of the wharf.

Chart 3276, and plan on 3277.

Directions.—A vessel, from the westward, bound to Port Iviza having passed through the Freo grande (page 242), should steer to the northward for Iviza citadel, and approaching it the islets should be observed, but until a near approach they may be blended with the high land. A vessel may pass on either side of these islets as convenient, avoiding the shoals before mentioned.

Vessels from the eastward may round Grossa and Botafoch islands at a convenient distance, as there are no dangers between the island and Dados rocks. Lladós islets, small and rocky, about 2 miles eastward of Grossa island, are bold, and there is deep water between them and the land half a mile distant.

Town.—The town of Iviza lies northward of the citadel: it had in 1910 a population of about 6,400. The industries are salt and fishing. A British Vice-Consul is resident.

Communication.—Weekly steam communication with Alicante, Valencia, and Palma; telegraphic communication with all parts.

Supplies.—Small quantities of provisions and water can be obtained.

General charts 1766, 1187, 1, 2158a, 449.

Chart 3276 and plan on 3277. Var. 12° 40′ W.

Submarine telegraph cables.—The island of Iviza is connected with Palma in Majorca by a submarine cable, and with Javea bay in Spain by two submarine cables.

Chart of Iviza and Formentera islands on 3276.

Cala Llonga (*Lat. 38° 57′ N., Long. 1° 31′ E.*).—Cape Llibrell, 4 miles north-eastward of Grossa island, is high, steep, and white, has an islet off it with a boat channel between, and half a mile northward is Cala Llonga, about a cable across at its entrance, and half a mile deep in a westerly direction. At the entrance there are 11 fathoms water, shoaling gradually to the beach at the head of the cove, and although a safe anchorage with all northerly winds, it is dangerous with those from south-eastward.

Water may be easily obtained in Cala Llonga from a well not far from the beach.

Santa Eulalia islet. — Punta Arabi, 3½ miles north-eastward of Cape Llibrell, is low, dark, and salient, and about a third of a mile to the southward of the point is Santa Eulalia islet, 121 feet high; west and north-west of Santa Eulalia islet, are three small rocks, named respectively, from the southward, Redona, Morenallet, and Caragolet islets.

About two-thirds of a mile south-eastward of Santa Eulalia islet is Losa Santa Eulalia, a rocky shoal, with about 4 feet water over it, of some extent, and on which the sea generally breaks; this shoal, steep-to, is dangerous at night and in thick weather, and there is a depth of 16 fathoms between it and the islet.

Anchorage, sheltered from northerly winds, may be obtained in the bay westward of Santa Eulalia islet.

Water may be procured from a small lake in the vicinity.

Cape Roig (Campanich), 2½ miles north-eastward of Punta Arabi, and the eastern extremity of Iviza, is steep above two-thirds of its height, the base being low, and a little salient; the intervening coast is clear of danger. About three-quarters of a mile to the northward of Santa Eulalia islet is Galera, and a cable further north-eastward Isla del Cana: they are close to the coast, leaving a passage for boats between.

Tagomago island, 374 feet high, lies about one mile eastward of Cape Roig, and is about one mile in length, in a north-westerly and south-easterly direction, level from the middle towards the south

Chart of Iviza and Formentera islands on 3276. Var. 12° 40′ W.

end, but uneven and lower towards the north; it is steep all round, but a large rock above water lies close off its north point. The channel between the island and the coast is about a mile wide, with a depth of 14 fathoms, and may be used by a sailing vessel with a fair wind.

Losa Figueral, 1¼ miles north of Cape Roig, is about 25 yards in extent, steep-to, nearly awash, and the sea always breaks on it; between it and the shore there are from 7 to 11 fathoms water.

Punta Grossa, the north-east extreme of Iviza, is high, steep, and broken, with a small islet close to it, leaving a boat passage between. A mile and three-quarters north-westward of it are the Hormigas (the Ants), two small islets on which the sea breaks, lying a cable from a flat point.

LIGHT (*Lat. 39° 5′ N., Long. 1° 36′ E.*). — On Punta Grossa a grey conical tower, 47 feet in height, exhibits, at an elevation of 180 feet above the sea, a *fixed* and *flashing white* light *every four minutes*, the eclipses being of *four seconds* duration; the light in clear weather is visible from a distance of 18 miles. *See* view facing page.

Telegraph cable.—The submarine cable connecting Iviza and Majorca is landed at Cala Vicente a small cove southward of Punta Grossa.

Punta Moscarte, about 3 miles north-westward of Hormigas islets and the north extreme of Iviza, is of moderate height, level, of a reddish colour, and covered with wood; a ledge of rocks extends a cable northward of the point. In a bight between Hormigas islets and Punta Moscarte are some small bays used by coasting vessels in fine weather.

Cala Portinaitx, one mile westward of Punta Moscarte, is formed by two low points, a cable apart. In the entrance there is a depth of 11 fathoms, and farther in 4½ fathoms, over good holding ground; vessels are sheltered with winds from N.E., round by South, to N.W., but exposed to those from the northward. The points of the bay being low do not shelter, and the sea often passes over them; near the east point the land rises a little, and on Punta Mares, on the west side, is a watch-tower.

Coast.—About a mile westward of Cala Portinaitx is Punta Charraca, high and steep, the coast between forming Cala Charraca, half a mile deep. About 1¼ miles westward of Punta Charraca is Caldes island, small, and with a shoal, on which the depth is 4½ fathoms, lying about a cable north-westward of it; from this the coast con-

No. 867.— PUNTA GROSSA—LIGHT DISCONTINUED.

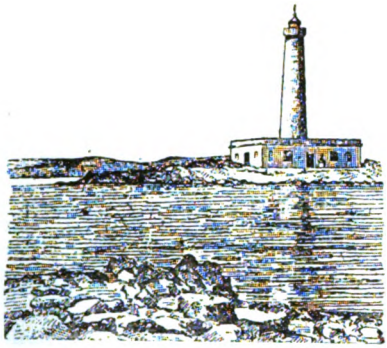
Position.—Lat 39° 04¾′ N., long. 1° 36½′ E.

Description.—A fixed and flashing white light.

Remarks.—The light has been permanently discontinued and is to be expunged from the charts.

Chart No. 3276. Med. 1, p. 246.

To face page 246.]

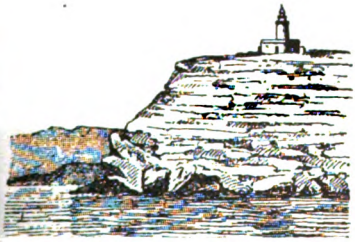


Puercos islet lighthouse.

Ahorcados islet lighthouse.

Punta Grossa lighthouse.

Covas Blancas lighthouse.



Cape Blanco (Conejera) lighthouse.

Punta Codolar (Formentera) lighthouse.

Chart of Iviza and Formentera islands on 3276. Var. 12° 40′ W.

tinues to the westward for about a mile to Cape Bernat, which has a shoal off its west extreme.

Puerto de San Miguel, entered west of Cape Bernat, and between it and Murada island, a distance of two-thirds of a mile, extends to the southward for about the same distance, and gradually narrows; the western side of the bay is lofty and steep. There is a depth of 13 fathoms in the bay, and at its head is a small port sheltered by a point, nearly insulated, and projecting from the western shore.

The port has a depth of 5½ fathoms and is used only by small vessels, which, in addition to their anchors, should have cables fast to the shore. Two small rivers run into the bay.

Cape Nono, 7½ miles westward of Puerto de San Miguel, is high, and remarkable from its sugar-loaf peak, 846 feet above the sea, and covered with wood; the projecting extremity is a steep white point. This cape is a good point to make in a vessel from the north-east if bound to Port San Antonio. Cape Negret or Verde point, 1⅔ miles south-south-westward of Cape Nono, is of moderate height and wooded.

Plan of Port San Antonio on 3277.

PORT SAN ANTONIO.—Between Cape Negret and Cala Basa, 2 miles to the south-westward, a bay extends about 1½ miles in an easterly direction, terminating in an extensive mud-flat, and having on its north-east shore the church and village of San Antonio.

LIGHT (*Lat. 38° 59′ N., Long. 1° 18′ E.*).—At Covas Blancas, on the north side of the port, a *fixed red* light is exhibited, at an elevation of 72 feet above the sea, from a pink octagonal tower, 34 feet high, and having a dwelling attached to it; the light is visible in clear weather from a distance of 7 miles. For arc of visibility, *see* Light list. *See* view, page 246.

Anchorage.—Vessels of any size may anchor in the bay during summer, but in winter north-westerly and northerly winds are common, and send in a heavy sea, when only vessels of 6 or 7 feet draught are safe, secured to the shore. The depth of water decreases from 20 fathoms at the entrance to 2 fathoms at the head of the bay, and the bottom is excellent holding ground.

The port is much resorted to by vessels for shelter from strong easterly winds, but in winter it should be left directly a change takes place. It may be also used in a south-westerly gale and easily entered; but it should not be resorted to with strong north-westerly winds unless in cases of great necessity.

General charts 1187, 1, 2158a, 449.

Plan of Port San Antonio on 3277. Var. 12° 40′ W.

In entering the bay middle channel should be kept, and when Cape Negret, the north extreme of the bay, is in line with Cape Nono, bearing 11° true, there will be about 18 fathoms water; thence steer for an anchorage in any convenient depth: with the church bearing about 70° true there is 7 fathoms water. Small vessels go farther in and secure with a cable to the shore.

Supplies. — Bullocks and firewood may be procured, and water obtained from a small stream which runs into the sea a little southward of the church.

Jetty. — There is a jetty, about 100 feet in length, which affords shelter to small boats.

Chart of Iviza and Formentera islands on 3276.

Coast. — From Port San Antonio the south coast has a westerly direction for 3½ miles to Punta Rovira, which is level, projects about a third of a mile to the northward, and has a ruined tower on it: about 2 cables north-east of the point, Payeret, a small islet, is clear of danger and inaccessible. Punta Embarcado, 1¼ miles south-westward of Punta Rovira, is of moderate height and salient.

Cala Badella (*Lat. 38° 55′ N., Long. 1° 13′ E.*).—A small bay 2¾ miles southward of Punta Embarcado, is narrow at the entrance, and about a third of a mile deep, in an easterly and south-easterly direction, having from 3 to 9 fathoms water with good holding ground.

Anchorage.—The bay affords anchorage for vessels of moderate size, sheltered from nearly all winds, and is resorted to by small vessels during north-easterly gales.

Submarine telegraph cable.—A telegraph cable from Javea bay, on the mainland of Spain, is landed at Cala Moli, about one mile northward of Cala Badella.

Coast. — Punta Pelat, 607 feet above the sea, is situated about two-thirds of a mile southward of Cala Badella; from thence the coast trends for 2 miles, in a southerly direction, to Cape Jueu, already described.

Conejera islets, lying close to the western part of Iviza, consist of a group of three islets named respectively Conejera, Bosque (woody islet), and Esparto. Conejera, 226 feet high, and with a tolerably even surface, extends one mile in a northerly and southerly direction.

LIGHT. — Cape Blanco, the north extreme of Conejera islet, is high and steep, and on its summit is a white circular tower 54 feet in height, and having a dwelling attached; it exhibits, at an elevation of 285 feet above the sea, a *fixed* and *flashing white* light *every minute.*

General charts 1187, 1, 2158a, 449.

Chart of Iviza and Formentera islands on 3276. Var. 12° 40′ W.
The fixed light is visible in clear weather from a distance of 16 miles, and the flashing 23 miles. *See* view, page 246.

Anchorage.—A bay on the eastern side of the island affords fair anchorage in its south-eastern part.

Bosque islet, about a third of a mile in length and 220 feet high, is joined by shoal ground to Conejera island, and to the mainland: with these exceptions it is steep-to all round, and has two high rocks at its north-western end. The passage between the islet and the mainland can only be used by boats with local knowledge, but small vessels may pass between Bosque and Conejera islets.

Esparto islet, about half a mile in length, and 226 feet high, lies nearly a mile westward from Punta Embarcado. A bay at the east end of Esparto and a rocky isle named Estacio form a little port, with 4½ fathoms water, adapted to small vessels, but a reef extends to the south-east from Esparto, on the south side of the entrance.

These three islets, although of some extent, are uninhabited: the largest, however, is used for pasture by the people of the neighbouring coast of Iviza.

Bledas islets (*Lat. 38° 59′ N., Long. 1° 10′ E.*), five in number, lie about 2 miles westward of Conejera islet, and extend 1½ miles in a northerly and southerly direction. The two northernmost, named Los Redondas (Round), are 3 cables apart and steep-to. The eastern Redonda is 43 feet high.

Bleda Plana, 62 feet high, lies southward of the western Redonda, and is separated by a rocky channel. About a third of a mile south-eastward of Bleda Plana is Bleda Mayor, round, and 128 feet high. Porros, the southernmost of the Bledas, about a quarter of a mile southward of Bleda Mayor, is a small islet divided into two parts, of which that to the north is shaped like a cap and named La Gorra.

FORMENTERA, the fourth of the Balearic islands as regards size, lies nearly 4 miles southward of Iviza, with channels between formed by the small islets already described, and known by the name of Los Freos; it is of moderate elevation (La Mola, the east and highest point, being 630 feet high), tolerably even, of an irregular figure, with a coastline of 37 miles in circuit, and generally a clean, bold coast.

It has some inaccessible cliffs on the east and west coasts, and sandy bays on the north and south, but neither harbour nor town. Its inhabitants, numbering about 2,000, and engaged chiefly in agriculture, occupy straggling houses, which form three parishes. Wild goats and sheep are found in the woods, and on its shores are seen great numbers of flamingoes.

General charts 1187, 1766, 1, 2158a, 449.

Chart of Iviza and Formentera islands on 3276. Var. 12° 40′ W.

Punta Prima, distant 3¼ miles south-eastward from the south end of Espalmador, is salient, low, black, and bold. To the westward of the point the coast forms a large bay, at the head of which, sheltered by some rocks, is Cala Pujols, used by fishing boats.

La Mola is the name given to that portion of level land which is surrounded by cliffs on all sides, forming the south-eastern end of Formentera. It presents a steep, red, rocky face to the eastward, of about 2 miles in length, another of equal dimensions to the south, but that on the north is of less extent, and being joined to the island by a low isthmus, about 3 miles in length and one in breadth, gives it, from a distance, the appearance of an island.

LIGHT (*Lat. 38° 40′ N., Long. 1° 35′ E.*). — On Punta Codolar, the south-east extreme of Formentera, a red conical tower 70 feet in height, and having a white dwelling attached, exhibits, at an elevation of 450 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 21 miles. *See* view, page 246.

Anchorage.—Between Punta Prima and La Mola there is a bay with a sandy beach, which, with the exception of a shoal with 3 feet water over it, lying off-shore in a northerly direction from the highest part of La Mola, is clear of danger, and affords anchorage, with south-westerly winds, in any convenient depth, the bottom being sand and the holding ground good.

The depths round this part of the island are generally from 13 to 18 fathoms close to the shore, but during strong-north-westerly winds, heavy squalls blow down over the cliffs, when a wide berth should be given to them.

South coast. — Cape Berberia, on which there is a tower, is the south-western point of Formentera, and between it and La Mola is a bay about 6 miles wide and 2 deep. Punta Anguila is situated about 2½ miles north-eastward of Cape Berberia, and from about two-thirds of a mile north-east of the point, to Punta Rotja, the south-eastern point of the island, the coast is fringed by a bank which, in places, extends for a distance of a third of a mile. Catala tower is situated 1½ miles north-eastward of Punta Anguila, at the commencement of Playa de Mitjorn, a beach which extends about 3 miles south-eastward of it.

West coast.—From Cape Berberia the coast trends for 3 miles to the northward to Punta Rasa, and for 2 miles is high and steep, then less elevated and level. About half a mile eastward of Punta Rasa is Cala Sahona, narrow at the entrance and about half a mile deep: Gabina tower stands on a point 1½ miles northward of Cala Sahona.

General charts 1187, 1766, 1, 2158a, 449.

Chart of Iviza and Formentera islands on 3276. Var. 12° 40′ W.

Anchorage.—Cala Sahona affords anchorage, in from 4½ to 5 fathoms water, with easterly winds, but it is exposed to those from the westward.

Cala Sabina and islet.—At 1¼ miles to the north-eastward of Gabina tower is Punta Pedreras, and three-quarters of a mile further east, is Sabina islet; between, Cala Sabina affords anchorage, but is open to winds between North and N.W. The coast in the vicinity of the cove is low, and here is the entrance of a large lagoon which scarcely admits boats, but within the water is deep enough for a launch. From Cala Sabina the coast, as far as the north point of Formentera, is low.

Tunny fishery.—Tunny nets are laid out, during the season, 1st February to 30th October, for a distance of about a mile north-westward of Sabina islet. For Lights, marks, and caution, *see* page 73.

Chart 1317, Majorca and Minorca.

MAJORCA.—Majorca or Mallorca, the largest of the Balearic islands, is about 44 miles to the north-eastward of Iviza, and 96 miles to the south-eastward of Cape Tortosa in Spain. Its extent east and west is 53 miles, and north and south 41 miles, and it is indented with deep bays on its north-east and south-west sides, the general aspect being picturesque.

The island is mountainous, particularly its north-west side, where the coast, nearly straight and rocky, is commanded by a range of mountains, of which the Puig mayor rises 4,741 feet above the sea; elsewhere the coast is lower and rocky, with but few beaches. The principal towns are Palma, the capital, Manacor, Felanitx, Soller, Inca, and Puebla.

The island of Majorca affords not only shelter in its spacious bays from the heavy north-westerly gales which sometimes blow from the Bay of Valencia, but in fact refuge may be found in every wind under its lee, either at anchor in the various coves or under way. It is clear of outlying danger, and may be approached, as well as the few islets off it, to a short distance.

Chart 2428, Dragonera island to Carril bay, &c.

PALMA BAY (*Lat. 39° 30′ N., Long. 2° 40′ E.*), the most important bay of Majorca, is protected from north-westerly gales by a high projecting arm of land which forms the western extreme of the island. The bay terminates on the west in Cabo de Cala Figuera, and on the east is Cape Blanco, distant 13¼ miles, and recedes 8½ miles to the north-eastward; at its head is the city of Palma, the capital of the island.

Although this spacious bay is entirely open to the southward and south-westward, there does not appear to be much risk at the anchor-

Chart 2428, Dragonera island to Carril bay, &c. Var. 12° 20′ W.

age, providing a vessel is in a proper berth on the western shore, with good ground tackle. The depth is 28 fathoms at the entrance, gradually decreasing to near the mole of the town.

Sand is the prevailing nature of the bottom, with occasional large patches of weed. There are several coves along the western shore of the bay, where small vessels resort for refuge in north-westerly gales.

Cabo de Cala Figuera. — Of the two capes which form the entrance of the bay, Cabo de Cala Figuera, which takes its name from a cove on its north-eastern side, is much the lower; it is 138 feet above the sea, rocky, with a tower on its summit, clear of danger, and may be approached to a prudent distance. On its north-eastern side is Cala Figuera, and three-quarters of a mile further, in the same direction, Cala de Portals. These two coves are used by fishing boats during north-westerly winds.

LIGHT (*Lat. 39° 28′ N., Long. 2° 31′ E.*).—About half a cable from the extremity of Cabo de Cala Figuera is a yellow conical tower 47 feet in height; it exhibits, at an elevation of 115 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 11 miles.

Sech islet, 1½ miles to the north-eastward of Cabo de Cala Figuera, and half a mile from the coast, is a small, low islet, steep-to, with a passage between it and the shore for small vessels, the depth of water being 6½ to 7 fathoms.

Bajo el Sech, with 2 fathoms water over it, lies a quarter of a mile north-eastward from Sech islet, with a depth of 5¼ fathoms between; shoal water extends about 2 cables westward of Bajo el Sech.

Tunny fishery.—Tunny nets are sometimes laid out during the season, 1st February to 30th October, about half a mile north-eastward of Bajo el Sech. For Lights, marks, and caution, *see* page 73.

Porrassa bay, 4 miles northward of Cabo de Cala Figuera, is 2 miles wide, and about three-quarters of a mile deep in a westerly direction, with 9 fathoms water at the entrance, which decreases to 2¾ fathoms near the shore. Porrassa island, 118 feet high, lies half a mile southward of Punta de la Torre or de la Porrassa, the south point of entrance, on which there is a tower. The bay affords security from all winds excepting those between south and south-east, which blow directly into it.

Near the north-eastern point of the bay are three rocky islets close to the shore named Las Isletas, but there is no passage between them, or between them and the shore. They are clear of danger on the outside.

General charts 1317, 1187, 2158a, 449.

Plan of harbour and anchorage of Palma on 3036. Var. 12° 20′ W.

Punta de San Carlos is 1¾ miles eastward of Las Isletas, and between a bay, named Cala Mayor, about three-quarters of a mile deep, is formed. Punta de San Carlos projects to the southward, is clear of danger, and steep-to. Fuerte de San Carlos, from which the point derives its name, stands on an elevation a short distance from the sea, and a little to the northward is another point, not so defined, forming the southern point of the mouth of Puerto Pi.

Puerto Pi. — A square tower stands on the north point of the mouth of Puerto Pi, and at the foot of it is a small battery. Puerto Pi in former times was of some importance, but is now choked with mud and sand, and can receive only small vessels, which, however, cannot go far in.

LIGHT (*Lat. 39° 33′ N., Long. 2° 37′ E.*). — A stone tower, 126 feet in height, situated on the south side of the entrance to Puerto Pi, exhibits, at an elevation of 131 feet above the sea, a *fixed* and *flashing white* light *every three minutes*, which is visible, the fixed light from a distance of 11 miles in clear weather, the flashing from 17 miles. From this tower vessels are signalised entering the bay.

Bajo del Corp Mari.—About a quarter of a mile to the north-eastward of Puerto Pi, a reef, named Bajo del Corp Mari, extends 1½ cables from the shore with 1¾ fathoms water on its edge; it is the only danger on the western shore of the bay, and should be avoided by sailing vessels working for the mole.

Buoy.—A black spherical buoy, with cylindrical topmark, marks the outer edge of this reef.

Depths. — The depths in the harbour are from 13 to 26 feet; in the entrance 24 feet; in the roads 7 to 8 fathoms.

Pilots.—*See* Regulations, page 9.

Harbour.—The old mole of Palma extends south-westward from the town, for a distance of 530 yards, thence in continuation is the new mole, which extends 750 yards in the same direction. At a distance of 200 yards inside the extreme of the new mole a mole, 80 yards wide, extends in a north-westerly direction for a distance of 150 yards. The space inside these moles, for a distance of about a cable to the northward, has a depth of from 23 to 26 feet. Another mole, Dique del Norte, is to be constructed running from abreast Punta Pedrosa, and leaving a space between it and the point for the outlet of Riera de Palma, to abreast the northern arm of the new mole, leaving a passage into the harbour 25 yards wide. A mole, Muelle de Santa Catalina, is also projected on the northern side of the harbour. The health office, and that of the captain of the port, is situated about 2 cables outside the root of the old mole.

General charts 2428, 1317, 1187, 2158a, 449.

Plan of harbour and anchorage of Palma on 3036. Var. 12° 20′ W.

An inner port, with an entrance 130 yards wide between Punta del Mollet and the health office, has depths of from 13 to 18 feet over a small space, and affords protection to small vessels, which are secured in tiers with their heads to the northward, and larger vessels are moored in the same way, with two anchors ahead, off the new mole. Vessels securing with their sterns to the mole should not approach it nearer than 65 feet, as the mole projects some distance below the water. With northerly winds, heavy squalls come down from the high land.

LIGHTS.—On the mole head from a grey octagonal tower, 38 feet high, over a circular building, is exhibited at an elevation of 61 feet above the sea a *white group occulting* light *every twelve seconds*, showing *three eclipses*, thus:—light, *four seconds;* eclipse, *one second:* light, *one second;* eclipse, *one second:* light, *four seconds:* eclipse, *one second;* the light is visible in clear weather from a distance of 9 miles.

A *fixed green* light is exhibited at an elevation of 21 feet above the sea from iron columns 14 feet high at each outer angle of the northern mole extending from the new mole. The lights are visible in clear weather from a distance of 2 to 3 miles.

Anchorage (*Lat. 39° 33′ N., Long. 2° 39′ E.*).—Vessels of deep draught anchor in the roads in about 8 fathoms, sand and weed, with the castle of Bellver over the Lazaretto bearing about 295° true, about half a mile from the molehead. If more protection is required they may proceed further in and anchor in about 5 fathoms, on the same bearing of Bellver castle, and with the cathedral bearing 61° true.

Vessels in quarantine or under observation anchor as near as possible to the Lazaretto.

South-westerly winds send in a heavy sea, and are very prevalent; southerly winds also cause a sea, but they are less frequent in the winter; the holding ground is good, however, and vessels seldom or never drag.

All over the bay the depths are from 18 to 27 fathoms, over a bottom of sand, except in the vicinity of Capes Regana and Enderrocat, where the bottom is rocky.

City.—The city of Palma, surrounded by a wall, stands on uneven ground near the coast at the head of the bay; the houses are large and well-built, but the streets are narrow and ill-paved. The chief buildings are the cathedral, governor's palace, exchange, town hall, and theatre. The wall of the town, as well as the cathedral is of red colour. The population in the year 1910 amounted to 68,359, and a British Vice-Consul is resident.

The lazaretto, surrounded by a wall near the sea, will be seen at the entrance to the harbour opposite the end of the New mole. On a

Plan of harbour and anchorage of Palma on 3036. Var. 12° 20′ W.

hill which is mostly covered with pines, and commanding the lazaretto and the adjacent coast as far as Puerto Pi, is the ancient castle of Bellver with its elevated tower. This celebrated castle is remarkable from its construction and the circular towers which flank it, and is seen at a great distance.

Communication. — Palma has steamship communication four times a week with Barcelona, and weekly with Valencia, Alicante, Port Mahon, and Iviza; railway communication with Manacor, Felanitx, La Puebla, and Soller.

Submarine cables connect it with Alicante, *viâ* Iviza, and with Minorca; telegraphic communication with all parts. The telegraph office is always open.

Coal and supplies. — A large amount of coal is imported for railway and steamship companies, a considerable quantity of which is in stock and can be had on emergency, but no large stock kept available for fleet purposes.

South-westerly winds might prevent or impede coaling.

Fresh provisions are plentiful, but only a limited supply of bread can be made; spring water may be obtained from the town supply by lighters.

Quarantine.—Palma is a first-class sanitary station; here vessels can have hull and cargo disinfected, and rats destroyed; *see* also Regulations, page 9.

Life-saving apparatus.—A lifeboat and rocket apparatus are maintained.

Trade.—At Palma there are silk and woollen manufactories; the exports comprise apricot pulp, almonds, oil, boots and shoes, locust beans, pigs, wines, and fruits; and the imports, consisting of coals, skins and hides, wood, petroleum, and machinery.

Shipping. — In 1910, 826 steam vessels, with a total tonnage of 457,359 tons, entered the port, and 277 sailing vessels with a total tonnage of 14,340 tons.

Wind and weather.—*See* Meteorological table in Appendix III.

Chart 2428, Dragonera island to Carril bay, &c.

Coast.—From Palma mole the shore of the bay trends to the south-eastward; it is low and foul, with shallow water as far as Punta de la Galera, a short distance off which is the islet of the same name. Near the east side of the point is the commencement of an extensive beach, known as the Arenal del Sur, which forms a bend and terminates near the small village Republicans; the sands of this long beach have accumulated to a great height, and extend inland as far as Lake Prat,

Chart 2428, Dragonera island to Carril bay, &c. Var. 12° 20′ W.

a short distance to the north-eastward. From Republicans to Cape Enderrocat, a distance of 2 miles, the coast rises to a height of about 360 feet.

Cape Blanco, the south-eastern extreme of Palma bay, derives its name from its white cliffs, and is surmounted by a lighthouse: it is of moderate elevation, steep, clear of danger, and easily recognised. From the south-eastward the land appears level as far as the foot of Randa mountain. Sailing vessels passing near the cape, with north-easterly winds, should be prepared for heavy squalls.

LIGHT (*Lat. 39° 22′ N., Long. 2° 47′ E.*).—On Cape Blanco a *fixed white* light is exhibited, at an elevation of 292 feet above the sea, from a grey square tower 36 feet in height; it is visible in clear weather from a distance of 10 miles.

WEST COAST.—Toro islet, about 2½ miles westward of Cabo de Cala Figuera, is round, 95 feet high, and steep-to. Between Toro islet and a narrow point which stretches out to the south-westward there are three rocks above water, two close to the point and one close to the islet: the largest is named Banco de Ibiza, and between it and Toro islet there is a channel with 9 feet of water.

Malgrats islet, 2¼ miles north-westward of Toro islet, is nearly half a mile long in a north-easterly and south-westerly direction, and is steep and higher than Toro islet. The coast between Toro and Malgrats islets is high, steep, of a red colour, and known as the Peñas Rojas.

Santa Ponza bay.—At 2 miles northward of Malgrats islet is Cape Andritxol, 587 feet above the sea, perpendicular, and of red colour, with its summit covered with red pines. The coast between forms the large bay of Santa Ponza, which extends about 2 miles to the north-eastward.

Submarine telegraph cable.—The telegraph cable from Iviza is landed in Cala de Santa Ponza, the eastern side of the bay.

Anchorage.—Off this coast vessels of any size may anchor with winds from the N.W., round by North, to S.S.E.; but with other winds it is unsafe, unless in one of the arms of the bay.

Coast.—Cape Llamp is situated 1½ miles westward of Cape Andritxol, and between is a bay, about a mile deep; north-westward of Cape Llamp, distant 1⅓ miles, Punta de la Mola, 387 feet above the sea, is the extremity of a promontory which forms the south side of Port Andraitx.

Port Andraitx, although having a depth of 6½ fathoms at the entrance, is by no means convenient for large vessels, as the water shoals rapidly to the shore.

General charts 1317, 1187, 2158a, 449.

Chart 2428, Dragonera island to Carril bay, &c. Var. 12° 20′ W.

Moles.—On the north side and about half a mile westward of the head of the port, a mole extends in a south-easterly direction for a distance of 164 yards. Another mole extends for a distance of 136 yards from the west side of the village. The entrance between the outer mole and the south shore is about 1¼ cables in width with a depth of 6 fathoms, which decreases gradually to 6 feet near the inner mole.

The town of Andraitx, containing about 6,500 inhabitants, stands at the foot of a hill 2¼ miles inland.

LIGHT (*Lat. 39° 32′ N., Long. 2° 23′ E.*).—From the Outer mole head a conical stone tower, 30 feet high, exhibits, at an elevation of 40 feet above the sea, a *white group occulting* light, showing groups of *three* occultations *every twelve and a half seconds*, thus:—light, *five seconds;* eclipse, *one and a half seconds;* light, *one and a half seconds;* eclipse, *one and a half seconds;* light, *one and a half seconds;* eclipse, *one and a half seconds;* the light is visible in clear weather from a distance of 12 miles. For arcs of visibility, *see* Light list.

The period of this light may vary, but the groups of *three* occultations will be maintained as its principal characteristic.

Anchorage.—The on-shore winds are from West and S.W., which send in a heavy sea, when the best berth is close under the north side of the bay, with a cable to the shore.

DRAGONERA ISLAND, 1,160 feet high, and 2¼ miles in length in a north-easterly and south-westerly direction, is situated 3½ miles to the north-westward of Port Andraitx; the northern coast is steep and the land slopes gradually to the south end: on Puig dels Uselles, 1,020 feet above the sea, and three-quarters of a mile from the south extreme, there is a pillar. The north-east end of the island is cultivated.

LIGHTS.—From a white masonry tower, surmounting a masonry dwelling with red roof, 44 feet high, erected at one cable northward of the south extreme of Cape Llebeitx, is exhibited, at an elevation of 418 feet, and visible from a distance of 27 miles, a *flashing white* light *every five seconds*, showing thus:—flash, *three-tenths of a second;* eclipse, *four and seven-tenths seconds.*

For arc of visibility, *see* Light list and chart.

From a white masonry tower, 35 feet high, with dwelling adjacent, erected on the north-eastern extreme of Cape Tramontana, is exhibited, at an elevation of 177 feet, and visible from a distance of 19 miles, a *group flashing white* light, showing a group of *two* flashes *every ten seconds*, thus:—flash, *three-tenths of a second;* eclipse, *two and two-tenths seconds;* flash, *three-tenths of a second;* eclipse, *seven and two-tenths seconds.*

General charts 1317, 1187, 2158a, 449.

Chart 2428, Dragonera island to Carril bay, &c. Var. 12° 20′ W.

For arc of visibility, *see* Light list and chart.

Channels.—Between the island and mainland the channel is half a mile wide, encumbered by rocks and shoals.

The islets in the channel are Pantaleu, 95 feet, and Mitjana, 26 feet high, situated on the main island side between Pantaleu and the main island; coasters may anchor, sheltered from all winds except those from the south-western quarters. About three-quarters of a cable northward of Mitjana is a shoal with 1¾ fathoms over it.

Calafats rocks, above water, are close together near Dragonera island, and lie in a southerly direction from its north-eastern point. In passing through the channel it is necessary to give them a wide berth, as the water near them is shallow. In a sailing vessel this channel should be used only with a steady leading wind, otherwise there may be squalls, eddies, and calms caused by the high land, with irregular currents.

Chart 1317, Majorca and Minorca.

NORTH-WEST COAST.—From Dragonera island the coast extends in a north-easterly direction for 48 miles to Cape Formentor, the north-east extreme of the island. It is clear of danger, and steep, being a continuous cliff, with scarcely any beach in its whole extent, and commanded by elevated mountains extending N.E. and S.W., which protect the greater part of the island from the severe northerly winds.

With on-shore gales a wide berth should be given to this coast, as the high land occasions calms, leaving sailing vessels near the land at the mercy of the heavy sea which sets right on it.

Punta de na Foradada, 4½ miles eastward of Dragonera island, may be easily distinguished; it is pierced, has a small islet near it, and a tower on the coast. At three-quarters of a mile eastward of this point are Los Farayons, some small islets rather more than a cable from the coast, leaving between a clear channel, with 2¾ fathoms water, used by small vessels.

Punta de Son Serralta (*Lat. 39° 40′ N., Long. 2° 29′ E.*) is 2¾ miles north-eastward of Los Farayons and 3¾ cables south-westward of it, and nearly 2 cables from the coast is a shoal, with 13 feet water over it, named Llosa de sa Tanca; one mile north-eastward of Punta de Son Serralta, Es Puntarro or Punta Varge (del Verger) may be easily recognised by the signal tower on it. Nearly a mile further, in an easterly direction, is the town of Banalbufar, very picturesquely situated, and growing Malmsey grapes.

From Punta des Corral fals, a mile north-eastward of Banalbufar, the coast has the same direction for 5¼ miles to Punta de na Foradada,

Chart 1317, Majorca and Minorca. Var. 12° 20′ W.

but recedes about a mile. Midway, Cala Valldemosa is a fishing village, and port of the town of the same name, which is distant nearly 2 miles inland. Between the town and Punta de na Foradada, Puig Gros, a conspicuous mountain of reddish colour, is 3,107 feet, and a little eastward of it is Tez, 3,491 feet high.

La Foradada, a small peninsula which extends about 3 cables in a northerly direction, and then turns at right angles to the westward, presents a front of about 2 cables, and is 272 feet above the sea; it is remarkable for a hole which runs through it.

Punta Deyá nearly a mile north-eastward of La Foradada, is 164 feet high, and has a tower on it.

Plan of Port Soller on 1187.

PORT SOLLER, near the centre of the north side of the island, is not readily recognised by vessels running along the coast, the entrance being narrow, formed by high land, and the points somewhat projecting; but the lighthouse on Cap Gros; a tower, seen between two points on the sandhills at the head of the bay; a church on the high land eastward; and a tower to the north-east of the latter are all landmarks. In the north-east part of the bay is a hermitage. The town of Soller, about 2 miles distant, had, in 1910, a population of about 9,000. The principal exports are oranges, almonds, and wine.

Cap Gros, 3 miles north-eastward of Punta Deya, is a large promontory, 417 feet above the sea, and the western point of the entrance to Port Soller. Creu point, the eastern point of entrance, is a quarter of a mile from Cap Gros.

LIGHTS (*Lat. 39° 48′ N., Long. 2° 40′ E.*).—On Cap Gros a grey circular tower 62 feet in height, with a dwelling near it, exhibits, at an elevation of 468 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 13 miles.

On Creu point a *fixed white* light is exhibited, at an elevation of 77 feet above the sea, from a grey conical tower 40 feet in height, with a dwelling near; in clear weather it is visible from a distance of 10 miles.

Jetty. — A jetty, 160 yards in length, extends in a south-easterly direction from about 1¼ cables eastward of Creu point lighthouse.

Anchorage. — The entrance, a quarter of a mile wide, between Cap Gros and Creu point, has depths of from 10 to 13 fathoms, and within the bay is about 3 cables in diameter, with a depth of about 5 fathoms in the centre, shoaling gradually thence towards the head. The anchorage, in about 5 fathoms water, is 1¾ cables south-eastward of Creu point lighthouse, but the bay being open to the north-west-

General charts 1187, 2158a, 449.

Plan of Port Soller on 1187. Var. 12° 20′ W.

ward a heavy sea sets in with the wind from that quarter. During fine weather, in summer, it may be resorted to in cases of necessity. A space about a cable in diameter, eastward of the jetty, with a depth of about 3¼ fathoms affords some shelter to small vessels.

Communication. — Steam vessels from Barcelona call weekly. There is a railway to Palma.

Wireless telegraph.—A wireless telegraph station, open at all times to the general public, has been provisionally established at Port Soller. Call letters E.A.O.

Supplies.—Provisions may be obtained from the town of Soller, water is good, but not always easily procured.

Life-saving apparatus.—A rocket apparatus is established at Port Soller.

Chart 1317, Majorca and Minorca.

Coast. — Picada tower is situated on the high part of a ravine, three-quarters of a mile north-eastward of Creu point, a mile eastward of it is an islet near the coast and 2 miles further, in the same direction, is Punta de Cala Rotja; all this part of the coast is high.

Morro del Forat, on the summit of which is a tower, is 1¼ miles north-eastward of Punta de Cala Rotja, a bay half a mile deep being formed between. About 2½ miles south-eastward of Morro del Forat, Puig Mayor, 4,740 feet above the sea, is the highest mountain in Majorca. *See* view, page 261.

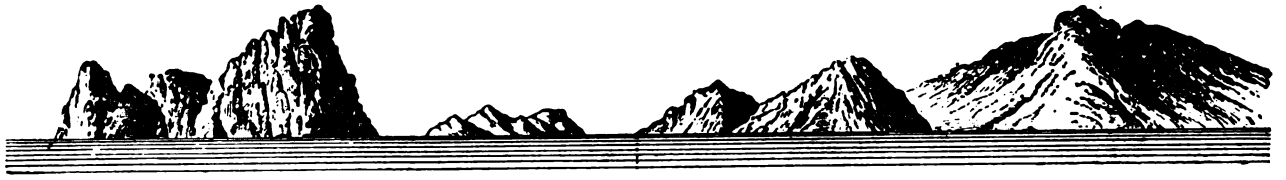
Morro de la Vaca, 2 miles eastward of Morro del Forat, is high and salient, and between is Mola de Tuent, with a tower and some ruins and a cove on either side of it, that to the eastward, named Cala de la Calobra, has a small beach, and here Torrente de Pareys, said to be the most picturesque in the island, runs into the sea.

Punta Beca, 7½ miles north-eastward of Morro de la Vaca, is jagged, of a reddish colour and backed by high land, the coast between being arid and mountainous. Morrillo de Burdils, 1½ miles eastward of Morro de la Vaca, has a tower on it, named Lluch, and south-eastward of this, three-quarters of a mile from the coast is Puig Roig, 3,290 feet above the sea.

Castillo del Rey (*Lat. 39° 55′ N., Long. 3° 0′ E.*), nearly 3 miles eastward of Punta Beca, is a ruined castle standing on a large rock, and the most conspicuous mark for this part of the coast.

Punta Galera, a narrow rocky point stretching out for more than half a mile in a north-easterly direction, from the coast, 1½ miles north-eastward of Castillo del Rey, is 236 feet above the sea at its extremity.

Punta Troneta, 2½ miles eastward of Punta Galera, extends about half a mile to the north-eastward, and is the termination of the



Summit of Vedrá islet, bearing 337° true, distant 6 miles. *Vedranell.* *Cabo Jueu.*

Atalaya del Morey. *Cape Farruch, bearing 189° true.* *Cape Formentor, 205° true, distant 29 miles.* *Puig Major, 217° true.*

Atalaya de la Victoria. *Cape Menorca.* *Cape Pinar.* *Cape Formentor, bearing 288° true, distant 16 miles.*

Cape Vermey, 204° true, distant 15 miles. *Cape Pera.* *Cape Freu.* *Puig Son Jaumel.* *Morro de Aubarca.* *Cape Farruch, bearing 242° true, distant 12½ miles.* *Atalaya del Morey.*

Chart 1317, Majorca and Minorca. Var. 12° 10′ W.

ridge of Sierra de Caball Bernat; nearly a mile south-eastward of the point, the Atalaya de Albercuitx, a sharp pointed mountain, is 1,276 feet above the sea and crowned by an old signal tower. *See* view on plan 3149.

Colomer islet, 1½ miles eastward of Punta Troneta, is nearly inaccessible, of a reddish colour and 381 feet high; there is a passage, about a quarter of a cable in width and with a depth of 5 fathoms between the islet and the coast. From Colomer islet the coast has a north-easterly direction, for 2½ miles to Cape Cataluña, which is rugged, massive, and 968 feet above the sea.

CAPE FORMENTOR (*see* views facing page), the north extreme of the island and the eastern extreme of the promontory of the same name, is 757 feet above the sea, arid, steep, and may be seen from a distance of 25 or 30 miles; the land forming the cape, from its irregularity in height, has the appearance of islands. A little westward of Cape Formentor is a hill, which at about two-thirds of its height, is pierced from side to side, so that the light is seen through; it is named Ne Furedade. On the rocky bottom which prevails off this cape are banks of coral.

LIGHT (*Lat. 39° 58′ N., Long. 3° 11′ E.*).—About a third of a cable from Cape Formentor, a dark grey conical tower, 70 feet in height, and having a dwelling near it, exhibits, at an elevation of 686 feet above the sea, a *fixed* and *flashing white* light *every thirty seconds*, which is visible in clear weather, the fixed light from a distance of 16 miles, the flashing from 30 miles.

POLLENSA BAY.—Cape Pinar, lying 4¼ miles southward from Cape Formentor, is 289 feet above the sea, but not so steep, and is of a reddish colour, with a few pine trees on its summit (*see* view on plan 3149), and from Punta Negra a black point three-quarters of a mile north-westward of it, Pollensa bay extends in a west-south-westerly direction a distance of 5½ miles with an average breadth of 2½ miles.

The cathedral at Alcudia is a very conspicuous building and may be seen from Pollensa bay.

Plan of head of Pollensa bay on 3036.

Formentor island, 3 miles north-westward of Cape Pinar, is about 6 cables long, in a north-west and south-easterly direction, 1½ cables broad and 125 feet high; the channel between it and the coast is only suitable for boats.

Cala Pino de la Posada, the small bay between Formentor island and Punta Moneya to the westward has a depth of 9 to

General charts 1187, 2158a, 449.

Plan of head of Pollensa bay on 3036. Var. 12° 10′ W.

10 fathoms across the entrance, and 5 fathoms about 3 cables from the entrance. It affords excellent shelter with northerly winds.

Punta Avanzada is the extremity of a sharp and narrow promontory, which extends nearly three-quarters of a mile in a southerly direction, from the north side of the bay, about 1¼ miles eastward of Port Pollensa; there is a fort on the promontory and a battery on the point.

LIGHT (*Lat. 39° 55′ N., Long. 3° 7′ E.*).—From an octagonal tower with a grey lantern, about 40 feet in height, surmounting a rectangular building of a reddish colour, erected 230 feet within the extremity of Punta Avanzada, is exhibited, at an elevation of 78 feet above the sea, a *white group occulting* light, showing groups of *two* occultations *every seventeen seconds*, thus:—light, *nine seconds;* eclipse, *three seconds;* light, *two seconds;* eclipse, *three seconds.* It is visible from a distance of 14 miles. For arc of visibility, *see* Light list.

Chart 1317.

South shore of the bay.—Cabo Gros is situated 1⅓ miles south-westward of Punta Negra, the west extreme of Cape Pinar, and a short distance southward of the cape La Victoria hermitage stands on the summit of a hill; all this part of the coast is rocky.

Punta Manresa, 1⅔ miles westward of Cabo Gros, is dark, rocky, and surmounted by an old battery; Punta Guarda, midway between, forms, with Punta Manresa, a bay, at the head of which is Mal Pas and some houses.

Plan of head of Pollensa bay on 3036.

Anchorages.—With strong winds from N.E., through East, to S.E., the anchorages in Pollensa bay are not good, as the swell sets in on both sides of the bay. In ordinary weather the best anchorage for large vessels is in 10 fathoms water, off Mal Pas on the south side, with Punta Manresa bearing 247° true, distant about 3 cables, but with strong winds from the northward better anchorage will be found, in about 9 fathoms water, about 3 cables southward of Punta Avanzada, or in about the same depth in Cala Pino de la Posada, as described in previous page; the bottom is generally uneven. Smaller vessels anchor in depths of 4 or 4½ fathoms.

North-easterly winds blow strong and cause a short sea, and with strong northerly or north-westerly winds it is necessary to be prepared for the heavy squalls which blow down from the mountains; as these squalls sometimes give little warning, great care is necessary in boats when under sail.

Town.—The town of Pollensa, 3½ miles by road from the port and not visible from the bay, has an agricultural population. A small

Plan of head of Pollensa bay on 3036. Var. 12° 10′ W.

pier extends from the shore at the port, and has a depth of 6 feet at its end.

Supplies may be obtained, but it is preferable to land, on the south side of the bay, and send to Alcudia.

Landing places at Mal Pas and Casa de San Pedro, about a mile to the westward, are near roads communicating with Alcudia, but the landing at the latter is only suitable for very light draught boats.

Chart 1317, Majorca and Minorca.

Coast.—From Cape Pinar the coast has a southerly direction for 1¾ miles to Cape Menorca, dark, and partly covered with trees; Bajo d'els Dachs, 2 miles in an easterly direction from the cape, is a shoal with 7 fathoms water over it, and depths of 15 fathoms close to. Atalaya Alcudia, a conspicuous peak 1,490 feet high, with a tower on it, lies about one mile westward of Cape Menorca. *See* view on plan 3149.

ALCUDIA BAY, formed between Cape Menorca on the north-west and Cape Farruch on the south-east, is 8 miles across.

Plan 3149, Alcudia bay.

Aucanada islet, on the north side of the entrance to Alcudia bay, lies about three-quarters of a cable from Punta Aucanada, with no passage between them. Shallow water extends 1½ cables from all seaward sides of the islet, and a berth should bo given to it. At rather more than a mile westward of the islet is the Torre Mayor, standing upon a hill which descends a short distance to a point of moderate height, having on its extremity the ruins of a battery. *See* view on plan.

Light (*Lat. 39° 50′ N., Long. 3° 8′ E.*).—On the summit of Aucanada islet, a yellow conical tower 46 feet in height, and having a yellow dwelling near it, exhibits, at an elevation of 72 feet above the sea, a *fixed white* light, which in clear weather is visible from a distance of 11 miles.

Albufera de Alcudia. — From the point of Torre Mayor, the coast trends to the north-west for half a mile and then curves round to the southward to the entrance of the canal to the Albufera de Alcudia, which, formed by the torrents from the mountains, is of considerable extent, and lies behind the narrow beach along the west shore of the bay.

The south shore of the bay is generally low, and from the entrance of the Albufera de Alcudia, trends round for a distance of about 7 miles to the south-eastward to Punta Llarga, thence north-eastward for 5 miles to Cape Farruch; midway between the entrance to Albufera de Alcudia and Punta Llarga is Porros islet, small and low. The

Plan 3149, Alcudia bay. Var. 12° 10′ W.

whole bay is clear of danger, and from the anchorage of Alcudia round to Cape Farruch, the 5-fathoms contour line is generally from a quarter to half a mile from the shore, increasing farther off to 9 and 13, and in the middle of the bay to 20 fathoms.

Pier.—There is a short pier at Caserio del Puerto, 3 cables to the southward of which a black buoy is moored in about 3½ fathoms water.

Anchorage.—The bay although more open to winds from north-eastward and eastward, which sends in a sea, is still preferable to that of Pollensa, as the bottom is better; it is also easier for a sailing vessel to enter with north-westerly or northerly winds, being less subject to the squalls from the mountains, except between Cape Pinar and Aucanada islet.

The best anchorage for a large vessel is in 8 fathoms, weed, with Aucanada lighthouse bearing 50° true and Torre Mayor bearing 326° true. A vessel of moderate size may anchor southward of the tower in 5 or 5½ fathoms, over fine gravel, with patches of weed; farther in the water shoals suddenly.

Town.—About three-quarters of a mile to the northward of the head of the bay is the town of Alcudia, the cathedral of which is very conspicuous, and some of the highest buildings can also be seen from the anchorage. The population is about 2,700; there is a coral fishery and some trade in boots, shoes, and baskets.

Communication.—Weekly communication with Barcelona and Port Mahon by steam vessels. Alcudia is 8 miles from Puebla, from which there is railway communication with Palma.

Supplies.—Fresh provisions and water may be obtained.

Life-saving apparatus.—A rocket apparatus is kept at Caserio del Puerto.

Chart 1317, Majorca and Minorca.

Cape Farruch (*Lat. 39° 48′ N., Long. 3° 21′ E.*).—The extremity of this cape is not high, but at a short distance to the southward, the land rises to Atalaya del Morey, a mountain, 1,483 feet above the sea, having on its summit an old tower (*see* view, page 261); it is connected with a chain of hills stretching to the south-west, Puig Morey, 1½ miles, and Bec de Farruch, 4¾ miles distant, being 1,844 and 1,706 feet respectively above the sea.

Morro de Aubarca, 3 miles south-eastward of Cape Farruch, projects slightly, is of a reddish colour and 220 feet above the sea. Farayo de Aubarca, an islet, 75 feet high, lies 3½ cables northward

Chart 1317, Majorca and Minorca. Var. 12° W.

from the Morro, with a clear channel between in which the depth is 11 fathoms, over sand.

At 2 cables south-eastward of the Morro, and 1½ cables from the shore, is Matsoch shoal with 1¼ fathoms over it.

Cape Freu, 3 miles south-eastward of Farayo de Aubarca, is the termination of Puig Son Jaumel, 889 feet above the sea, and having on it a pillar and an old signal tower (*see* view, page 261); the cape, of a dark colour and inaccessible, stretches out to the north-eastward and appears almost square and isolated.

Westward of Cape Freu the Playa de la Mesquida has a remarkably white sandy beach, and 1¼ miles west-north-westward of the cape there is a shoal, with 2¼ fathoms water over it, lying nearly half a mile from the coast.

Cape Pera (*see* view, page 261), 2 miles southward of Cape Freu and the eastern extreme of Majorca, is a little salient, white, 302 feet above the sea, flat, and steep, being higher nearer the point than towards the land; at a distance of 18 to 25 miles it appears as an island. In the bay northward of the cape, a shoal, with 4 fathoms water over it, named Mula de la Agulla, lies about 3½ cables from the coast. At half a mile southward of the cape is Punta Farayo, and westward of Punta Farayo a bay affords anchorage for small vessels during westerly winds. Cela tower stands on the land over the middle of the bay, and a small islet, 30 feet above the level of the sea, lies south-eastward of Punta Farayo.

LIGHT (*Lat. 39° 43′ N., Long. 3° 29′ E.*).—On Cape Pera a grey conical tower, 55 feet in height, having a white dwelling near it, exhibits, at an elevation of 265 feet above the sea, an *alternating fixed and flashing* light showing *fixed white* with a *red flash* every *two minutes;* it is visible in clear weather, the fixed light from a distance of 17 miles, the flashing from 22 miles.

Submarine telegraph cable.—A telegraph cable to Minorca is landed about a mile westward of Punta Farayo.

SOUTH-EAST COAST OF MAJORCA.—From Cape Pera the coast has a southerly direction for 3⅔ miles to Cape Vermey, which is of a reddish colour from its base to two-thirds of its height, and then becomes covered with pine trees. It is broad and elevated with a tower on its summit, 607 feet, and another inland named Mascot, 771 feet above the sea.

The town of Arta is situated 5 miles north-westward of Cape Vermey, and here are the celebrated caves of Arta.

General charts 1187, 2158a, 449.

Chart 1317, Majorca and Minorca. Var. 12° W.

Cape Pinar or **del Rey,** 2 miles south-westward of Cape Vermey, is the termination of the Sierra de Son Jordi, which is 1,035 feet above the sea; the cape is dark in colour.

Punta Amer, 3¼ miles south-westward of Cape Pinar, is low and projecting, with a castle on its summit 128 feet above the sea and some distance from the point. The space between the cape and the point is chiefly low land, and named Arta bay, in which some rocks or islets form a cove named Port Vey, but with little water, and open to southerly winds. It may be known by a castle and tower on a hill, which is steep over the sea, westward of the islets.

Arta bay.—Anchorage.—On the north side of Punta Amer, at any convenient distance, there is good anchorage for vessels, in from 9 to 14 fathoms water, over sand, with good holding ground, and sheltered from westerly winds.

Cala Manacor (Port Cristo), 4 miles south-westward of Punta Amer, is the outlet of a torrent named Cap d'Estoy, forming a lagoon inside the entrance with the village of Colonia de Nuestra Señora del Carmen on its north side, from which there is a carriage-road to Manacor, where is a railway. A tower, 128 feet above the sea, stands on the south side of the entrance.

Port Colom is 8 miles to the southward of Cala Manacor, and between are a number of coves, but none of importance. The entrance to Port Colom is about 250 yards in breadth, with deep water, but at 1½ cables within it shoals rapidly, so that vessels drawing 10 feet water must anchor in a position exposed to southerly winds, which send in a heavy swell. Vessels of less draught may anchor in 8 feet in a bight farther in, sheltered from wind and sea. On the north-west point of entrance is a ruined battery, and close to the point there is 9 fathoms water.

LIGHT (*Lat. 39° 25′ N., Long. 3° 14′ E.*).—On the north-east point of entrance to Port Colom a *fixed white* light is exhibited, at an elevation of 82 feet above the sea, from a grey conical tower, 26 feet in height, and with a white dwelling near; it is visible in clear weather from a distance of 10 miles.

Pier.—A pier, 400 yards in length, extends from the west side of the harbour parallel to the village, which is also situated on the west side; a road connects Port Colom with Felanitx, where is a railway.

Buoys.—There are four buoys in the harbour; three of wood indicate the direction of a dredged channel; the other, of iron, is used for vessels, stern warps.

Puig de San Salvador, 1,673 feet above the sea, situated 4½ miles north-westward of the port, and standing in the middle of

Chart 1317, Majorca and Minorca. Var. 12° 10′ W

comparatively low land, has a hermitage on its summit, and forms a conspicuous mark for Port Colom.

Coast.—From Port Colom the coast has a south-westerly direction for 3¼ miles to Cala Llonga; at 2¾ miles is the entrance to Cala Ferrera, which has two creeks inside; two rocky shoals with 14 and 21 feet water over them lie about one cable and 1½ cables respectively off the entrance points.

Cala Llonga.—The entrance to this bay is 300 yards wide and forms three creeks, the largest of which extends half a mile inland, but the greater part is shoal. About 20 yards from the south-west point of entrance is a shoal with 5 feet water on it. The entrance is not easily recognised until near it, on account of the uniformity of the coast in its vicinity; the only marks are a small fort and a house on the south-west point.

Anchorage.—There is accommodation for a few vessels of moderate size, which should moor head and stern in from 3¾ to 4½ fathoms water, but south-easterly winds send in a considerable sea.

Port Petro (*Lat. 39° 22′ N., Long. 3° 13′ E.*), about 1¼ miles west-south-westward of Cala Llonga, is open to the southward, and 1½ cables wide at the entrance, with 5½ fathoms water close to on either side; it may be recognised by a high, square fort resembling a tower on the south-west point of entrance, there being no other of that form in the neighbourhood.

Anchorage.—The port extends some distance to the northward, but a vessel of moderate size should anchor in 5½ fathoms water, and moor with a cable to the west shore and an anchor to the eastward; but there is no room for more than two such vessels; small vessels may go farther in, but the water shoals rapidly from 3 fathoms to one fathom.

The port is dangerous to enter in bad weather, on account of its narrow entrance, and the whole coast is of steep rock, causing a rebound of the sea with broken water from either side of the entrance, therefore a sailing vessel should be well under command. Sail should be shortened immediately within the entrance, as there is no room to run up the bay.

Cala Santañy, at 4 miles west-south-westward of Port Petro, is suitable only for coasters; it may be known by a tower on its east point, which is somewhat higher than the rest of the coast and the church of Santañy, 2 miles inland, may be seen. Two coves between Port Petro and Cala Santañy afford no shelter.

Cape Salinas, 5½ miles south-westward of Cala Santañy, and the south extreme of Majorca, is low and well wooded, the land sloping

Chart 1317, Majorca and Minorca. Var. 12° 10′ W.

gradually down, from an elevation, on which there is a tower named Gosta, 210 feet above the sea, to the point; a shoal extends about half a cable southward of the point, and at the distance of half a mile there is a depth of 7 fathoms.

LIGHT (*Lat. 39° 15′ N., Long. 3° 3′ E.*). — About a third of a cable within the extreme of Cape Salinas a grey conical tower, 33 feet in height, and surmounting a white dwelling, exhibits, at an elevation of 54 feet above the sea, a *fixed white* light, which in clear weather is visible from a distance of 10 miles.

Shelter.—The coast between Cape Pera and Cape Salinas trends nearly north-east and south-west, is level, bold, and clear of off-lying dangers, and resorted to by all classes of vessels that do not care to enter a port during north-westerly gales; it may be approached to any convenient distance. With north-westerly gales the best shelter will be found between Cape Pera and Cala Longa, and with north-north-westerly gales between Cala Longa and Cape Salinas. A vessel should not go northward of Cape Pera in a gale, as the full force of the wind and a heavy sea will be felt.

Port Campos, nearly 4 miles north-westward of Cape Salinas is only suitable for small vessels; it is open to the south-west, about a mile deep, and fronted by several islets and rocks. A tower stands on the west point, and near it are saltworks which supply the whole of Majorca.

Coast. — From Cape Salinas to Cala Pi, a cove of no importance, the coast is in general low, with here and there beach skirted by rocks; thence begins high land, which continues to Cape Blanco (page 256).

Plan 2394, Cabrera and adjacent islands.

CABRERA ISLAND, 7 miles south-westward of Cape Salinas, and about 10 miles in circuit, is mountainous and rugged, and the hills covered with silver pine, wild olive, and box; the coast is high, steep, and clear of danger. There are several islets around the island, especially at the north end, between which and Cape Salinas of Majorca the channel, with depths of from 18 to 20 fathoms, is 5 miles wide (*see* view on plan). The few inhabitants cultivate patches of ground, and tend the flocks.

Tides.—The tides around the island are irregular, rising or falling a foot or two, according to the wind.

Port Cabrera, situated on the north-west side of the island, is sheltered from all winds, for although partly open to the northward, it is protected from that quarter by the island of Majorca. It is about 2 cables wide at the entrance and three-quarters of a mile deep, and on the east side of the entrance is a fort with a small guard.

General charts 1187, 2158a, 449.

Plan 2394, Cabrera and adjacent islands. Var. 12° 10′ W.

The Governor's house, the remains of houses formerly occupied by prisoners of war, and a few huts are the only buildings. There is a short jetty. A mausoleum, erected to the memory of French prisoners, lies on the north-eastern slope of Es Peñal Blanch, a hill half a mile southward of the bay, and 541 feet above the sea.

Anchorage. — The depth of water is from 5 to 25 fathoms, the bottom gravel and weed, and a large vessel may lie close to the shore; vegetation extends to within two or three feet of the sea.

Directions.—Port Cabrera being close to the southward of Cape Lebeche, the north-west extreme of the island, the cape should be steered for in entering, passing between Creuete point on the eastern side and a cave in the precipice on the western side of the entrance: a little within Creuete point is a ruined castle. A sailing vessel, entering with a strong north-westerly wind, should be prepared for heavy whirling squalls, which descend from the high land, and attention is also necessary with the wind from the eastward, although the squalls are less severe.

Punta Anciola, the south-western extreme of the island, is situated about 2 miles southward of Cape Lebeche; it is a small peninsula about a third of a mile in length, 394 feet above the sea, and joined to the island by a very narrow neck.

LIGHT (*Lat. 39° 8′ S., Long. 2° 55′ E.*). — On the south end of Punta Anciola is a square yellow tower 71 feet in height, with a dwelling near: it exhibits, at an elevation of 386 feet above the sea, a *fixed* and *flashing white* light *every thirty seconds*, which is visible in clear weather, the fixed light from a distance of 16 miles, the flashing from 27 miles, but is obscured by high land to the northward. *See* view on plan.

Ets Estells. — Near the middle of the south side of Cabrera are four small islets named Estells or Estellengs, the two highest about a cable from the island are named Estell Xapat, the largest being 144 feet high, the two others named Estells de Fuera are about 2½ cables to the southward with a channel between in which the depth is 22 fathoms; they are clear of danger, with deep water round them.

Redonda islet. — Half a mile northward of Cape Ventoso, the north-eastern extreme of Cabrera, is Redonda or Round islet, 184 feet high; between it and the cape there is a passage with from 13 to 16 fathoms water.

Conejera island. — About two-thirds of a mile to the northward of the north coast of Cabrera island is the south-west point of

General charts 1317, 1187, 2158a, 449.

Plan 2394, Cabrera and adjacent islands. Var. 12° 10′ W.

Conejera island, the largest and highest of the islets in the vicinity of Cabrera; it extends nearly a mile in a north-north-east and south-south-west direction, is 400 feet high, and, between it and Redonda, there is a passage with depths of from 10 to 13 fathoms.

In the distance of 1¼ miles northward of Conejera island are six islets; from Conejera island, those named are respectively Esponja, 75 feet; Plana, 72 feet; Pobre, 79 feet; and Horadada, 89 feet high; the two unnamed islets lie between Pobre and Horadada islets, which latter is the northernmost of the group, and is pierced through.

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

Cabrera channel, between Cabrera and Majorca, is 5 miles wide, with depths of from 18 to 20 fathoms, but about 10 fathoms at two-thirds of a mile from Cape Salinas. In this channel the currents are frequently strong, and follow the direction of the prevailing winds, usually east or west in this locality.

MINORCA. — The island of Minorca, the second in size of the Balearic islands, and the north-eastern of the group, is about 27 miles in length, in a north-west and south-easterly direction, with a mean breadth of 10 miles and an area of 260 square miles; it is of moderate height, generally level, with a remarkable conical elevation near the middle named Mount Toro, rising 1,174 feet above the sea, on the summit of which is a castle clearly distinguished in fine weather from a distance of 40 miles. It has about 115 miles of coast, much broken on the north, but more regular on the south, and is generally clear of danger, the few islets and rocks being near the coast.

The principal harbours are Port Mahon, the capital, at the east end of the island; Port Fornells, on the north side; and Ciudadella at the west end. There are none on the south, the coast being, however, clear of danger; in bad weather, during northerly winds, a vessel may anchor anywhere off it, on a bottom of sand of shells, or may stand off and on under sail, at a short distance from the island.

Plan 148, Port Mahon.

PORT MAHON (*Lat. 39° 53′ N., Long. 4° 17′ E.*).—The island of Minorca lying in a central position and midway between the Gulf of Lyons and coast of Africa, renders Port Mahon an excellent harbour of refuge and place of call, especially in winter. The only inconvenience for sailing vessels is the difficulty of entering with strong northerly winds, but good shelter will be found under the south side of the island.

This capacious harbour, at the south-east end of the island, extends in a north-westerly direction for a distance of 3 miles, with a breadth varying from 2 to 6 cables, and affords accommodation for numerous

General charts 1187, 2158a, 449.

Plan 148, Port Mahon. Var. 11° 50′ W.

vessels of the largest size. The southern shore is generally bold and steep-to; but the northern, terminating from a chain of hills which commences at the entrance, is bordered by a bank. On both shores there are several coves of more or less extent, with deep water.

The mouth of the harbour, open to the south-eastward, is formed by San Carlos point on the south-west and Fuera or Mola point on the north-east, distant 3 cables apart. From these points at 6 cables within, abreast the lazaretto, the channel narrows to one cable, but farther in the breadth increases.

Depths.—The depth in the entrance channel is from 6½ to 9 fathoms. Outer anchorage 14 to 23 fathoms. Inner anchorages 6 to 14 fathoms and 8 to 11 fathoms.

Pilots.—Under ordinary circumstances the entrance to Port Mahon is easy for sailing vessels with all southerly winds. The pilots reside at Villa Carlos, and leave for sea directly the signal is made, from La Mola, that a large vessel is approaching. Should additional assistance be required and the signal be made, the necessary boat, men, and anchors are always ready. Pilotage is compulsory for merchant vessels. *See* also Pilotage regulations, page 9.

La Mola, a rocky promontory connected to the mainland by a narrow isthmus, extends eastward from the entrance of the port for a distance of nearly a mile, and terminates in a bold cliff named Punta Esperó (Cape Mola). This rocky mass is 249 feet above the sea, with rugged inaccessible red cliffs. On the slope is the large castle of Isabel, and fortifications commanding the entrance to the port. When seen from north or south it appears in the shape of a wedge inclining to the westward. *See* view on plan.

Signal station.—There is a signal and telegraph station, about a quarter of a mile westward of Punta Esperó, with which vessels can communicate by means of the International code.

San Carlos point.—San Carlos point is low and rocky, and on it are the remains of the formidable fort of San Felipe, the Protestant cemetery, and the lighthouse. A shoal on which the depths are from one fathom to 4 fathoms extends three-quarters of a cable from the point.

LIGHT (*Lat. 39° 52′ N., Long. 4° 18′ E.*).—On San Carlos point, 137 yards from the castle, a *group occulting white* light, showing a group of *four* eclipses *every fifteen seconds*, thus:—light, *six and a quarter seconds;* eclipse, *one and a quarter seconds;* light, *one and a quarter seconds;* eclipse, *one and a quarter seconds;* light, *one and a quarter seconds;* eclipse, *one and a quarter seconds;* light, *one and a quarter seconds;* eclipse, *one and a quarter seconds;* is exhibited, at an elevation of 72 feet above the sea, from a white iron post, 20 feet in

Plan 148, Port Mahon. Var. 11° 50′ W.

height, near a white dwelling; in clear weather the light is visible from a distance of 9 miles.

Buoy. — A black conical buoy, surmounted by a cylindrical topmark, is moored on the 5-fathoms edge of the shoal, and three-quarters of a cable eastward of San Carlos point.

Fuera or Mola point, on the north-east side of the entrance, and the termination of the headland named La Mola, is low, rocky, and surrounded by a reef which extends three-quarters of a cable southward to the 5-fathoms contour line.

Buoys.—A red conical buoy, surmounted by a triangular topmark, is moored nearly a cable southward of the point, close outside the 5-fathoms line; and a red can-shaped mooring buoy is moored about 1½ cables southward of the point.

The channel, available for large vessels, between the two conical buoys on each side of the entrance, is little more than 1½ cables wide, and the depth increases from 3½ fathoms on either side to 12 fathoms in mid-channel.

San Felipet point and shoals (*Lat. 39°52′N., Long. 4°18′E.*). —At about 2 cables within Fuera point, and on the eastern side of the harbour, is San Felipet point, the termination of an island on which is the lazaretto. The point is low, narrow, with a battery and tower, and from it a rocky shoal with depths of from one fathom to 3¼ fathoms extends a cable south-eastward.

Buoy.—A red conical buoy, surmounted by a triangular topmark, is moored about 50 yards westward of San Felipet point.

Cala Taulera (Mulberry cove). — Between the Lazaretto island and La Mola is a narrow inlet named Cala Taulera, extending in a northerly direction for 6 cables, having depths of from 5 to 7 fathoms for about 2 cables and gradually shoaling to the head, where it is very shallow. An artificial channel, cut through an isthmus, connects the cove with the harbour, and the narrow isthmus of La Mola, about half a cable in breadth, separates it from the sea. Cala Taulera and the artificial channel are reserved for military purposes.

Laja del Moro. — On the western side of the channel, opposite San Felipet point, the coast is also bordered by a rocky shoal, Laja del Moro, with 1¾ fathoms water over it, which, with that bordering San Felipet point, narrows the navigable channel to less than a cable. The sea generally breaks more or less on all these dangers at the entrance of the harbour, according to the state of the wind.

Buoy. — A black conical buoy, surmounted by a cylindrical topmark, is moored on the edge of this shoal, and three-quarters of a cable westward of the preceding buoy.

General charts 1317, 1187, 2158a, 449.

No. 197.—Port Mahon—Light-Buoys Established.

(*a*) *Position.*—At a distance of about one cable eastward from San Carlos lighthouse, in the position formerly occupied by the red conical buoy which has been withdrawn.

San Carlos lighthouse, lat. 39° 51¾′ N., long. 4° 18¼′ E.

Description.—A red conical light-buoy, exhibiting a *flashing red* light *every three seconds*, thus:—

Flash,	eclipse.
$\frac{3}{10}$ sec.	$2\frac{7}{10}$ secs.

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(*b*) *Position.*—At a distance of about 2½ cables north-eastward from San Carlos lighthouse, in the position formerly occupied by the black conical buoy which has been withdrawn.

Description.—A black conical light-buoy exhibiting a *flashing green* light *every three seconds*, thus:—

Flash,	eclipse.
$\frac{3}{10}$ sec.	$2\frac{7}{10}$ secs.

(*c*) *Position* (*approximate*).—On Las Titas shoal, at a distance of about 470 yards, 103° (*S. 66° E. Mag.*), from the tower of the Military hospital on Isla del Rey.

Description.—A conical light-buoy, painted in red and white horizontal stripes, exhibiting a *flashing white* light *every three seconds*, thus:—

Flash,	eclipse.
$\frac{3}{10}$ sec.	$2\frac{7}{10}$ secs.

Variation.—11° W.

Chart No. 148. Med. I, pp. 272, 273, 275.

No. 503.—Port Mahon Entrance—Amended Buoyage.

Former Notice.—No. 197 of 1916.

Details.—The four buoys marking the entrance channel to Port Mahon are incorrectly described in Admiralty publications; the correct descriptions are as undermentioned and the publications are to be amended accordingly:—

(*a*) *Position.*—At a distance of about one cable eastward from San Carlos lighthouse.

San Carlos lighthouse, lat. 39° 51¾′ N., long. 4° 18¼′ E.

Description.—A red conical buoy with cylindrical topmark, and not a red conical light-buoy.

(*b*) *Position.*—At a distance of about one cable south-eastward from Fuera (Mola) point.

Description.—A black conical buoy with triangular topmark, and not a black conical light-buoy.

(*c*) *Position.*—Marking the Moro rocks, at a distance of about 1¼ cables westward from San Felipet point.

Description.—A red conical light-buoy exhibiting a *flashing red* light *every three seconds*, and not a red conical buoy with cylindrical topmark.

(*d*) *Position.*—At a distance of about 50 yards westward from San Felipet point.

Description.—A black conical light-buoy exhibiting a *flashing green* light *every three seconds*, and not a black conical buoy with triangular topmark.

Chart No. 148. Med. 1, pp. 272, 275.

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(b) *Position.*—At a distance of about one cable south-eastward from Fuera (Mola) point.

Description.—A black conical buoy with triangular topmark, and not a black conical light-buoy.

(c) *Position.*—Marking the Moro rocks, at a distance of about 1½ cables westward from San Felipet point.

Description.—A red conical light-buoy exhibiting a flashing red light every three seconds, and not a red conical buoy with cylindrical topmark.

(d) *Position.*—At a distance of about 50 yards westward from San Felipet point.

Description.—A black conical light-buoy exhibiting a flashing green light every three seconds, and not a black conical buoy with triangular topmark.

Chart No. 148. Med. i. pp. 272, 275.

Plan 148, Port Mahon. Var. 11° 50′ W.

Quarantine (Cuarentena) island, fronting Cala de San Jorge or Sa Viñase on the east shore, lies about a third of a mile above Lazaretto point, and is a cable in length, flat, 62 feet above the sea, and has the old lazaretto on it. Vessels lie in tiers on its north-east side, with their sterns to the shore, and in the cove there are from 5 to 9 fathoms water. The floating dock is moored here.

Isla del Rey (Hospital island) (*Lat. 39°53′N., Long. 4°17′E.*). —About half a mile beyond Quarantine island is Isla del Rey; here Don Alfonso III. of Aragon landed when he conquered Minorca in 1287; and a military hospital was erected on it in the 18th century.

It is nearly circular and 1¼ cables in diameter, 95 feet above the sea, and steep-to on its western side, but on its north-east side a flat extends off, leaving between it and the coast bank a channel with 4½ fathoms water, about a third of a cable in breadth. The channel between the island and south-west shore is more than a cable wide, with depths of 11 and 12 fathoms.

Las Titas, a rocky shoal, with 3 fathoms water over it, lies 1½ cables eastward of Isla del Rey, with which it is apparently connected by a narrow spit.

Isla de Las Ratas (Rat island), 33 feet above the sea, lies a cable westward of Isla del Rey, and in the channel between there are depths of from 8 to 9 fathoms. It is surrounded by shoal water extending about a distance of 30 yards, but from its north end a shoal, with from 2 to 3 fathoms water, extends, and is connected to the north shore by a bank. Between the island and the south-west shore there are from 9 to 12 fathoms. On the western end of the island is a ruined pillar, the base being only just visible.

Pinta (Arsenal) island. — On the north shore, at rather more than three-quarters of a mile above Isla del Rey, is the commencement of the arsenal, the walls of which extend along the foot of the hills which command the port. Pinta island, an islet with storehouses, and surrounded by a sea wall, is connected to the arsenal by a bridge, and vessels of moderate size may lie alongside it. Beyond the arsenal, the north shore continues in a westerly direction for nearly half a mile, and rounds at the head of the port, where the water is shallow.

Frares spit, 3 cables westward of Pinta island, extends nearly a cable in a southerly direction from the north shore, and has depths of from one foot to 4 feet over it.

Beacon. — A black conical masonry beacon, with a white band, and surmounted by a red ball, is situated in the centre of this spit.

General charts 1317, 1187, 2158a, 449.

Plan 148, Port Mahon. Var. 11° 50′ W.

Cala Figuera (English cove), southward of Punta Cala Figuera, is about 2 cables deep and 1½ wide at the entrance but quickly narrowing; it has from 6 to 7 fathoms water in the outer and centre portion but shoals towards the shores; there is a cotton factory at the head of the cove.

The whole of this anchorage is somewhat exposed to the northward, and winds from that quarter blow strongly; vessels wintering here moor on the north side, nearest the shore, where the wind is less felt; it is, however, a good summer anchorage.

Villa Carlos (*Lat. 39° 53′ N., Long. 4° 17′ E.*). — Punta Cala Fonts is salient, and the east extreme of Villa Carlos, a modern, well-built town, with barracks on the south-west side, 2 cables from Quarantine island; southward of the point is Cala Fonts, open to the eastward, but here sailing vessels often lie moored head outwards and stern to the shore, awaiting a favourable opportunity for leaving. Cala Corp indents the centre of Villa Carlos, and Villa Carlos point is its north extreme.

Outer anchorage. — The shore in the vicinity of the entrance of the port forms a bend, and the bottom is clean sand. In smooth water there is anchorage in from 14 to 23 fathoms water, over good holding ground, with the wind from North, round by west, to about S.W., but should it blow hard from the northward with much sea, a vessel should leave.

Inner anchorages. — There is good anchoring space between Quarantine island and Isla del Rey in from 6 to 14 fathoms water, over sand, gravel and mud, avoiding Las Titas shoal.

Between Punta Cala Figuera and Isla de las Ratas there is an area, about 3 cables square, forming a natural basin, named La Plana, with depths of from 8 to 11 fathoms in the middle, over a bottom of mud, and shoaling somewhat towards the shore; it is the best part of the harbour, and capable of receiving a number of vessels.

A good position for a large vessel to take up, is with the following marks and bearings:—the passage between Isla de las Ratas and Isla del Rey just open, bearing 124° true, the centre of San Antonio (Golden farm), bearing 23° true, and the north angle of Pinta island in line with Punta Cala Figuera, bearing 298° true, in 9 fathoms water, over sand and shells.

H.M.S. *Cornwall* moored in this position and reported that there was no room for a longer vessel than herself; the holding ground seemed poor as she dragged an anchor during a northerly gale and narrowly escaped grounding.

[1]General charts 1317, 1187, 2158a, 449.

Chart 1317 and plan 148. Var. 11° 50′ W.

Directions. — A vessel from the southward or eastward should bring Mount Toro, the isolated conical hill surmounted by a castle, near the middle of the island, to bear 308° true, and steer for it. As the land is approached, La Mola, with its red cliffs to the eastward and southward, will be seen on the eastern, and the lighthouse on San Carlos point, Villa Carlos, and the town of Mahon on the western side of the entrance. *See* view on plan.

Aire island lighthouse, the watch tower and white buildings of the fortifications of La Mola, the walls of the lazaretto, the dark walls of Fort San Felipe, with the numerous buildings in the interior of the port, are all landmarks.

From the northward Mount Toro will be seen from a long distance appearing like an islet, and afterwards other elevations; in the vicinity of La Mola, and bearing to the northward of it, a part of the town and Villa Carlos, with the mastheads of any shipping in port, will be seen over the isthmus connecting La Mola with the main island.

In rounding La Mola, should there be any sea running from the northward or eastward, a wide berth should be given to it; when the cape is passed, steer along southward of the cliffs for the entrance.

Approaching from the south-west, La Mola with the barracks and batteries will be open, but few other buildings, which mark the entrance, will be seen until near it.

The leading marks through the entrance, which together give a good mid-channel course, are the centre of San Antonio (Golden Farm), a little open of Lazaretto point, bearing 326° true; or a yellow house on Punta Cala Fonts, well open of Rédo point, bearing 319° true; but the yellow house touching Rédo point leads on Laja del Moro, and inside the buoy marking it.

San Antonio (Golden farm) (*Lat. 39° 54′ N., Long. 4° 17′ E.*) is square, of reddish colour, and with a tower; standing alone on a hill north-eastward of La Plana it is very conspicuous. Rédo point is dark coloured; the yellow house is square with a flat roof.

As the channel into the port is long, narrow, and has a north-north-westerly direction, the best winds for entering, under sail, are those from N.E., round by East and South, to West. When the wind is scant from either side lofty sail should be kept on the vessel, as the lower sails at times do not fill in consequence of calms and eddies, and the anchor should always be ready to let go.

In standing towards Fuera point reef, keep Lazaretto point open: and in standing towards San Carlos shoal, do not go to the westward of the line of the leading marks. Above Lazaretto point the harbour opens out, and a vessel may proceed as convenient.

The shoals at the entrance are not dangerous, but in a sailing vessel

General charts 1187, 2158a, 449.

Plan 148, Port Mahon. Var. 11° 50′ W.

with a scant wind they should be carefully avoided; with a heavy sea the breakers appear to extend across the channel, as if closing the mouth of the harbour; but on approaching, the channel will be seen.

With a gale from the eastward nearly the whole of the entrance is covered with breakers, but as this wind would be fair for a sailing vessel entering it is only necessary to observe the leading marks and to keep in mid-channel. When the narrows at San Felipet point are passed the water deepens, and though the north-east shore is bordered by a narrow bank, the southern shore is generally clear and bold.

The current at times sets strongly towards Punta Esperó, which should not be approached by a sailing vessel too closely, especially in light winds. During strong north-west winds, squalls blow down from La Mola, when a berth should be given to it.

It is advisable for sailing vessels in the Gulf of Lyons with a northerly gale, and bound for Port Mahon or running for refuge, not to enter that harbour, but to seek shelter under the lee of Minorca, hugging the land as close as safety admits during the night, so as not to get to leeward, the coast being clear.

Should a vessel anchor outside the port in a gale from N.W. or West, the first favourable opportunity should be taken, especially in winter, to enter the harbour, as in the event of the wind shifting to the eastward and blowing strong the anchorage would be unsafe, but is sheltered from North, round by West, to S.W. When blowing strong from the northward there is always a considerable swell outside the port, and the sea breaks on the shoals as well as along the coast. Moor with open hawse to the northward.

Currents.—There are no regular tides at Port Mahon, but the water rises and falls according to the direction and force of the wind. With the wind from the south-east or south-west quarters the water rises, but from the north-west or north-east quarters it falls. At times the water rises without any apparent cause, when the ports and bays in the Gulf of Lyons are alike affected; it is considered a prelude to a northerly wind.

When northerly or north-westerly winds prevail a strong current sets to the south-west of Punta Espéro and Aire island. This current is almost constant, with a rate of one knot an hour in calm weather, but it sets in the opposite direction with strong winds from the south-westward.

Town (*Lat. 39° 53′ N., Long. 4° 16′ E.*).—The town of Mahon, the capital of Minorca, stands on the south side, with its centre about half a mile from the head of the port. It is tolerably well built, having wide, though in places steep and badly paved, streets, a large church, several chapels, two convents, courthouse, barracks, hospital,

General charts 1317, 1187, 2158a, 449.

Plan 148, Port Mahon. Var. 11° 50′ W.

several schools, custom-house, &c., and is lighted with electric light; it extends over a space of nearly three-quarters of a mile, with a pleasing aspect, and, in the year 1910, had an estimated population of 18,000. A British Vice-Consul is resident.

Communication. — There is weekly steamship communication with Palma, and with Barcelona, calling at Alcudia. Mahon is in telegraphic and telephonic communication with all places in Minorca, and in telegraphic communication with the world by the submarine cable to Majorca.

Coal and supplies. — About 3,000 tons of coal are kept in stock by private firms, and 800 tons by the Government; vessels are coaled by baskets, at the rate of 350 tons in 24 hours, there being five lighters holding 20 tons each. There is a coal wharf 3,000 feet in length, with depths alongside of from 12 to 15 feet.

Fresh meat, bread, and vegetables can be procured, but, if possible, the Consul should be communicated with before the arrival of the vessel. Water is good, and is supplied in a tank vessel from a hose on the quay.

Dock. — There is a floating dock inside Quarantine island. For particulars, *see* Appendix I.

Repairs. — The Spanish Government have an arsenal here for torpedo works, and large repairs to machinery can be effected; there is a crane which will lift 10 tons, and small vessels up to 50 tons have been built.

Quarantine. — Port Mahon is a first-class sanitary port; here vessels can have hull and cargo disinfected, and rats destroyed. See also page 9.

Trade.—The principal industry in the island is the manufacture of boots and shoes and silver chain purses, the other exports being machinery, iron and steel, cheese, and live stock; the imports are coal and coke, clay and cement, bran, flour, spirits, wine, &c.

Shipping. — In 1909 the port was entered by 267 vessels having a total tonnage of 89,531 tons.

Weather.—*See* Meteorological table in Appendix III.

Chart 1317, Majorca and Minorca.

NORTH COAST. — The north coast of Minorca is broken, rocky, and foul, having but few beaches, and these of limited extent, with here and there islets and rocks at a short distance from the coast. In addition to the port of Fornells it has several places which afford shelter to small vessels, but with these exceptions there is no anchorage along the whole north coast of the island, on account of the great depth of water and heavy sea. As the coast is low, not easily seen during

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

bad weather, and exposed to the full force of northerly gales and currents in winter, it should be carefully avoided by passing vessels.

Cape Negro, $1\frac{3}{4}$ miles northward of Punta Espero, and so named from its dark colour, is of moderate height and projects sharply to the northward. To the north-west of the cape are several coves, each with a small beach, but of no importance. In front of Cala Mesquida and Cala Binillanti, two rocks, named Mesquida and Bombasa, resemble the hulls of vessels keel uppermost; Mesquida is foul, and with the least swell the sea breaks on the rocks which surround it. All along this part of the coast the bottom is rocky.

Colom island (*Lat. 39° 58′ N., Long. 4° 17′ E.*), $2\frac{3}{4}$ miles to the northward of Cala Mesquida, is 144 feet high, with a channel only suitable for boats, between it and the coast. Off the east and south points are some rocks above water, a cable from it is a sunken rock with 10 feet on it, and a shoal, with $4\frac{3}{4}$ fathoms water over it, lies nearly a quarter of a mile from its north-east side.

Anchorages.—On the north-west side of Colom there is anchorage for vessels of moderate size, leaving an islet or rock, close to the island, on the port hand entering; here a vessel may lie, in $5\frac{1}{2}$ fathoms water, with an anchor to the north-west and a cable fast to the island to the south-east, sheltered from all winds but those from the north-east, which cause a heavy swell, but with good anchors and cables there is no danger.

Vessels of moderate size may also lie on the south side of the island, with an anchor to the south-east and a cable to the shore of the island, in $5\frac{1}{2}$ or 6 fathoms water, over sandy bottom, sheltered from all winds but those from the eastward, which send in a heavy dangerous sea.

Off Galera point, the south extreme of the anchorage, is a rock or islet, having between it and the land a passage only suitable for boats.

Small vessels may enter an inlet extending nearly $1\frac{1}{2}$ miles in a west-north-westerly direction, but it is shallow, with sunken rocks at both points of entrance, and in entering, mid-channel should be kept; within the inlet there is shelter from all winds.

Cape Favaritx, $2\frac{1}{4}$ miles northward of Colom island, is 46 feet high, and at the distance of about 9 miles appears like three islands: it projects a considerable distance and to the westward of it the land rises to 279 feet above the sea.

Cala Addaya and the islands of the same name lie 3 miles westward of Cape Favaritx; the largest island lies in a north-east and south-west direction, and is 72 feet high; the islands to the northward of it are small, flat, and very low.

General charts 1187, 2158a, 449.

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

Entering Cala Addaya it is necessary to keep under the western shore which is clear of danger, leaving the islands, five in number, on the port side, and having passed another small island within the port, anchor in 3½ fathoms water, opposite Cala Moli, which is westward of the latter island. Cala Addaya extends thence about a mile to the south-eastward, but it is shallow and only adapted for vessels of light draught.

The depth at the entrance to the port is 6½ fathoms, very near the western shore 2¾ fathoms, and at the mouth of Cala Moli 3½ fathoms, decreasing inwards, the bottom being mud and weed, with patches of sand. Vessels of about 200 tons enter this port, but it should not be attempted without the aid of a pilot, for there are hidden dangers, and the channel is intricate and narrow. With a sea from the northward or north-eastward it breaks across the entrance, but with north-westerly winds the water is smooth.

Water may be readily obtained.

Punta Fantirat (*Lat. 40° 3′ N., Long. 4° 10′ E.*), 3 miles to the northward of Addaya islands, is low and projects but little; thence the coast trends for 1½ miles to the north-west, and is steep, uneven, and winding.

Plan of Port Fornells on 148.

Murté point, which is very narrow and extends about 2 cables in a northerly direction, lies about 1½ miles westward of Punta Fantirat; Fornells watch tower, 430 feet above the sea, is situated about a quarter of a mile south of Murté point.

PORT FORNELLS.—Na Ponsa, 3 cables south-west of Murté point, is the east side of the entrance to Port Fornells, and the steep, high land of which these points are the termination is in its shape, cliffs, and colour said to resemble La Mola of Port Mahon. Cape Fornells, the west point, is low and foul, some of the rocks being awash, and others covered about 30 yards from the shore. Tirant island, north-westward of the cape, lies near the shore, with a passage between for boats.

Port Fornells is nearly landlocked, and capable of containing a number of vessels of large size, but the anchorage is not good: it is moreover much exposed to the northerly gales, which prevail in the winter, and cause a heavy sea in the entrance, and thus render the approach dangerous.

It is 2½ miles deep, in a southerly direction, and a quarter of a mile wide at the entrance; the head of the harbour is being filled up by the sand brought down by the rains; it has several coves and three islets.

General charts 1187, 2158a, 449.

Plan of Port Fornells on 148. Var. 11° 50′ W.

Depths. — The depth at the entrance is 16 fathoms; there is 10 fathoms off the village, and it then shoals gradually to the head of the harbour.

Sargantana islet (*Lat. 40° 3′ N., Long. 4° 8′ E.*), the largest lies a mile from the entrance, on the eastern side, and is 2 cables in length, one in breadth, and 46 feet high, with a castle on its north end; as it is in line with the entrance it is seen from outside. Rabells islet, close to the southward of it, is smaller, the space between it and the shore being blocked up with mud and weed.

Anchorages.—Large vessels anchor abreast Creu point in from 6½ to 10 fathoms water, vessels of moderate size farther south in about 5 fathoms, and coasters nearer the shore, with the entrance shut in. If mooring, the anchors should be north and south in the centre of the channel. The bottom is generally mud and weed, and the holding ground bad, as the anchors drag very easily.

In these positions vessels will, as elsewhere, be unsheltered from north winds, which blow with great force and much persistence during the winter, and send in a heavy sea.

Directions.—Port Fornells will be recognised by the resemblance of the eastern side of the entrance to La Mola, at Port Mahon, also by the lighthouse on Cape Caballeria, 2½ miles north-west, and in entering it is only necessary to keep in mid-channel; should the wind be fresh from the northward or north-eastward, a sailing vessel must carry sufficient sail to keep way on through the different gusts of eddy wind, sometimes fair and then foul, which are met with abreast the entrance, beyond which the wind will be steady: there is a bar of breakers across the entrance with strong northerly winds.

No vessel should attempt to enter without a pilot.

Tides.—The greatest rise and fall observed in Port Fornells is in the month of January, at which time it is 2 feet.

Village. — The village of Fornells, the inhabitants of which are mostly employed in fishing, is on the western coast, about half a mile from the entrance, and has a fort and circular tower.

Water is scarce, the wells of the village being brackish, but in the fort it is good, but scarce.

Chart 1317, Majorca and Minorca.

Coast. — To the westward of Port Fornells, and between it and Cape Caballeria, a large bay, 2 miles wide and the same deep, is formed, which has several small islets. On the east side the land is moderately high, but at the head of the bay it is low and terminates in a sandy cove, named Cala Tirant, with a small river running into it and a rock or islet in front of it.

General charts 1187, 2158a, 449.

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

From Cala Tirant the coast is still low, and forms, for about a mile to the northward, a beach; the land then begins to rise, extending beyond a small point and an islet to Cape Caballeria.

Cape Caballeria, distant 2½ miles from Murté point, and the extremity of a promontory that extends 2 miles in a northerly direction, is salient, high, and steep, but decreasing in height to the southward, so that when seen at a distance from east or west it appears like an island.

LIGHT (*Lat. 40° 5′ N., Long. 4° 5′ E.*). — On the extremity of Cape Caballeria is a white conical tower 47 feet in height, with a dwelling near; it exhibits, at an elevation of 309 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 24 miles.

Nitge island, two-thirds of a mile westward of Cape Caballeria, is 23 feet high at the north end, but low at the south. A shoal, with 4 feet water over it, extends from the south-west point of the island, and in the passage, between the island and the cape, only small vessels with local knowledge can pass, as there are many rocks covered and uncovered.

Anchorage. — To the southward of the island and westward of Cape Caballeria is a cove named Port Nitge, only suitable for moderate-sized vessels, which are sheltered from all winds, moored head and stern in 3½ fathoms water off a cave on the west shore. The cove is about half a mile deep, and the entrance from 1½ to 2 cables wide. In entering, Nitge island should be left on the port, and a large rock or islet, a cable from the west point of the cove, on the starboard hand. Should a vessel take the ground no injury will result, as the bottom is soft mud.

Coast. — At 2½ miles to the south-westward of Nitge island is Bledas island, with an islet or rock on both its west and south sides; it is 197 feet high, and has a shoal, with 9 feet water over it, lying about a quarter of a mile off the north-west end; between it and the coast the channel is fit only for small coasters. The bay between these islands is about 2½ miles wide and 1½ miles deep, and in it are several islets, coves, and stretches of beach and sandy shore.

Peñal Antecristo, 3½ miles westward of Bledas island, is a lofty precipitous headland, 646 feet high, and 1¼ miles in a westerly direction is Cape Falconera, broad and projecting, and 335 feet high; off this cape are rocks and shoals, as also off Punta Rotja, nearly a mile to the westward.

Coast.—Bernardi point, about one mile westward of Punta Rotja, is the extremity of land 285 feet above the sea, and in the bay between are several coves which are only available for fishing boats.

General charts 1187, 2158a, 449.

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

Between Bernardi point and Punta San Escua, a distance of $1\frac{3}{4}$ miles, three detached shoals, with 3, 18 and 13 feet respectively, lie off the coast at a distance of about $1\frac{1}{2}$ cables: the eastern shoal lies off the extreme of Punta San Escua.

Escull den Nate, $2\frac{1}{4}$ miles westward of Punta San Escua, is moderately high, steep, with a rocky islet near the coast, close to which there is a depth of 16 fathoms; more to the north-east are two other islets or rocks near each other, and a short distance south-west, some rocks, extending $1\frac{1}{2}$ cables from the coast, have from 10 to 19 feet water over them.

CAPE MINORCA (*Lat. 40° 1′ N., Long. 3° 47′ E.*), $2\frac{1}{2}$ miles south-westward of Escull den Nate, is the western extreme of the island, and slopes down from Bajoli tower, which stands 265 feet above the sea, forming apparently two steps in its descent; there is a sunken rock off this point, and the depth of water near it is 18 fathoms, over stiff ground. Bajoli tower is 33 feet high and another tower, Ram tower, lies about a quarter of a mile eastward of it.

Signal station. — Semaphore. — There is a semaphore at Cape Minorca, with which vessels can communicate by the international code of signals. *See* also page 67.

Coast.—From Cape Minorca the coast is low and steep for about a mile; it then turns to the eastward for $1\frac{1}{2}$ miles to Ciudadela; in this latter distance there are three coves.

Ciudadela. — The inlet leading to the town of Ciudadela is so narrow, that a small sailing-vessel, even in fine weather, can scarcely tack; it extends to the north-eastward for about half a mile, and, at the entrance, the depth is $6\frac{1}{2}$ fathoms, shallowing to 11 feet at about half the above distance, the bottom being all sand and gravel.

The town, which is walled, contained in 1910 about 8,700 inhabitants, and has a good coasting trade. It is seen from seaward, and has a chapel and battery on the south point of entrance: vessels should steer for the latter, and may pass close to it as the shore is clear of danger. Vessels should not enter the inlet in a south-westerly gale, as the entrance is covered with breakers.

LIGHT. — On Cape Frares the west side of the entrance to Ciudadela inlet a *fixed white* light is exhibited, at an elevation of 66 feet above the sea, from a dark grey conical tower, 34 feet in height, with a white dwelling near: in clear weather it is visible from a distance of 10 miles.

General charts 1187, 2158a, 449.

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

Buoy.—At about 1½ cables to the south-east of the port a red and white chequered mooring buoy is moored in 10 fathoms water; it is chiefly intended for mooring vessels, which, with winds from N.N.W., round by North, to E.S.E., find a difficulty in entering the harbour.

Anchorage.—Winds from South to West send in a heavy swell, and, except with these winds, vessels may anchor off the entrance in any convenient depth under 13 fathoms, the bottom being everywhere good.

Coast.—From Ciudadela inlet the coast, extending in a southerly direction, for 2½ miles to Cape Negro which projects slightly, is low but steep, and between are three coves; the middle being alone available for coasters, the others are suitable for fishing boats, but south-westerly winds send in a heavy sea.

Cape Dartuch, 1¾ miles south of Cape Negro, is low and flat, but steep and clear of danger; at two cables from it there are 16 to 18 fathoms water, and the same depth is found from the cape to Ciudadela, at an equal distance from the coast.

LIGHT (*Lat. 39° 55′ N., Long. 3° 49′ E.*).—On Cape Dartuch a white conical tower 50 feet in height, and having a dwelling near it, exhibits, at an elevation of 80 feet above the sea, a *fixed* and *flashing white* light *every three minutes*, which in clear weather is visible from a distance of 15 miles; this light and that of Cape Pera of Majorca, mark the Freu de Menorca.

Shoal. — Punta Guardia is three-quarters of a mile eastward of Cape Dartuch, and a small shoal, on which the sea breaks when there is a heavy sea, is situated south-eastward of the point at no great distance from the land, and is dangerous for small vessels working along the coast; between it and the shore the water is deep.

Submarine telegraph cable. — A telegraph cable from Majorca is landed near Punta Guardia.

SOUTH COAST. — From Cape Dartuch, the south coast of Minorca forms with its south-east extreme near Aire island, a bay of about 2 miles deep, with outside soundings of from 16 to 20 fathoms. The coast from the cape gradually rises and trends eastward 4 miles, having several little bays between of no importance; in this vicinity the land is the highest on this part of the coast, and of a white and red colour.

Cala Santa Galdana.—At 6½ miles eastward of Cape Dartuch is a projecting point, and to the north-eastward of it is Cala Santa Galdana, the best and most capacious bay on the south coast of Minorca, and capable of receiving small vessels.

General charts 1187, 2158a, 449.

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

Anchorage. — The anchorage, somewhat sheltered, is in 2¾ fathoms water, over sand, off a cove on the eastern side of the bay; river freshets and discharged ballast have injured the harbour, and in winter it should not be frequented.

Coast.—From Santa Galdana the coast becomes lower, with some sandy beaches for 7 miles eastward as far as the commencement of Peñas de Alayor, which are some high steep cliffs of a reddish colour, having a tower on the summit, and from the Peñas de Alayor for a distance of 3 miles to the south-eastward, at nearly equal distances apart, are several other coves, but none adapted for anything but fishing boats.

Es Caragol, a reef situated nearly 2 miles westward from Aire island lighthouse and 2 cables from the coast, is about 3 cables in length, dries at low water, and the sea does not always break on it; at a third of a cable southward of it there is a depth of 7 fathoms, over weeds; and between the shoal and the land there are from 3½ to 4½ fathoms water.

Anchorages.—Along the whole southern coast of Minorca, there is good anchorage with northerly winds, in from 16 to 18 fathoms water, being careful to keep the summit of Mount Toro in sight over the land; for if the mount be entirely hidden, the bottom will be rocky.

There is also excellent anchorage, with winds from north-west to north-east, between Es Caragol and the west part of Aire island, in from 14 to 22 fathoms water, over sand, and not far from the coast, taking care to avoid Es Caragol reef. The best berth is eastward of the reef, at about three-quarters of a mile westward of Aire island.

Aire island (*see* view on plan 148).—The north-western part of this island is low and flat, but the south-east is more elevated and steep-to; it is about three-quarters of a mile in length, and lies nearly the same distance from the coast; about a third of a mile north-eastward is Aire rock, the ground between being foul. The depth between the island and Minorca is 4¾ fathoms, diminishing regularly to 2½ fathoms at a cable from either coast.

LIGHT (*Lat. 39° 48′ N., Long. 4° 18′ E.*). — On the summit of Aire island a red conical tower, 118 feet in height, with a white dwelling near it, exhibits, at an elevation of 171 feet above the sea, a *fixed* and *flashing white* light *every minute*, which is visible in clear weather, the fixed light from a distance of 16 miles, the flashing from 20 miles.

EAST COAST. — In Cala Rafalet small coasters, with good anchors and cables, may in case of necessity seek shelter under an islet

General charts 1187, 2158a, 449.

Chart 1317, Majorca and Minorca. Var. 11° 50′ W.

at the entrance; but winds from the eastern quarters, cause a considerable swell, and northerly winds also send in so much sea as to render it somewhat dangerous.

Plan 148 and chart 1317.

San Carlos point (*Lat. 39° 52′ N., Long. 4° 18′ E.*), on the south side of the entrance to Port Mahon, is 2 miles northward of Punta Rafalet and on the south side of the point is Cala San Estéban (St. Stephen cove) sufficiently large for vessels of about 200 tons; but winds from the northward, round by east to south-east, send in so much sea as to render it useless. From the channel, formed between Aire island and Minorca to Port Mahon, the coast, except at a point half a mile north of Punta Rafalet, where a reef extends for 30 yards, and south-east of Penjat tower, where a rock lies three-quarters of a cable off-shore, is clear of danger, and it may be approached to a prudent distance. *See* view on plan.

The channel between Majorca and Minorca is much used by vessels sailing between the African and French coasts, especially during the winter, as there is less sea and current than to the eastward of Minorca, besides the benefit of anchorages, should such be required.

General charts 1187, 2158a, 449.

CHAPTER V.

THE COAST OF AFRICA.—CEUTA TO CAP MATIFU.

(*Lat. 35° 0′ N. to Lat. 37° 0′ N.*)
(*Long. 5° 30′ W. to Long. 3° 20′ E.*)

Variation in 1912 decreasing about 6′ annually.

MAROCCO—*continued.*

Plan 2742, Ceuta bay. Var. 14° 20′ W.

MAROCCO.—From Ceuta the coast southward of Punta Almina forms a bay about 12 miles in extent and 3½ miles deep. Punta Zorra is situated three-quarters of a mile south-westward of Ceuta, and between is Ensenada de la Almadraba (Madraga), where vessels which have been obliged to leave Ceuta bay on account of north-westerly winds, or those unable to fetch the bay, may anchor with good shelter from the north-westward.

A small stone mole, for the use of boats, lies at the head of the bay. It is known as El Boquete.

Submarine telegraph cable.—A telegraph cable is landed near the head of Ensenada de la Almadraba. Vessels must be careful not to anchor near it.

Piedra de la Vina, 19 feet high, lies 2½ cables south-westward of Punta de la Zorra; there is shoal water between Piedra de la Vina and the point, and also for a distance of about 2 cables eastward of the rock.

Tunny fishery. — Tunny nets are laid out in Ensenada de la Almadraba during the season, and extend half a mile eastward of Punta de la Zorra. For Lights, marks, and caution, *see* page 73.

Boundary.—The Spanish and Maroccan boundary lies about one mile south-westward of Punta de la Zorra.

Chart 142, Strait of Gibraltar.

Punta de Castillejos (*Lat. 35° 51′ N., Long. 5° 21′ W.*), about 4½ miles to the south-westward of Punta de la Almina, is low, rocky, of a red colour, with shallow water some distance off, and a depth of 2½ fathoms at 6 cables from the point. Thence a sandy beach, with a

Chart 142, Strait of Gibraltar. Var. 14° 20′ W.

few rocks here and there, trends southward, nearly straight, in a southerly direction, as far as the foot of Cabo Negro. Kamsala village is situated 2 miles westward of Punta de Castillejos.

Roco Caballo, covered at high water, spring tides, is small, with 5½ fathoms water near it, and lies a long mile southward of Punta de Castillejos, and 3 cables from the shore. A shoal, with 4 fathoms over it, lies 7 cables from the shore, and nearly 3 miles southward of Punta de Castillejos. These are the only known dangers of any importance on this stretch of coast.

The Spanish fortifications will be seen on the eastern slope of the Sierra Bullones, the ruins of a large tower on the heights of Castillejos, some marabut towers at a distance from the coast, the ruins of a tower on Monte Verde, and the same in the bay on the north side of Cabo Negro.

Plan 2742, and chart 142.

Anchorages.—The anchorage in Ensenada de la Almadraba is southward of the town in from 9 to 12 fathoms water, but there are some patches of rocky bottom which should be avoided. A large vessel should anchor farther out.

Vessels may also anchor with off-shore winds in 12 fathoms water, over sand, southward of Punta de la Zorra, three-quarters of a mile from the beach, in 12 fathoms with Punta Castillejos bearing about 235° true, distant 1½ miles, or off any part of the beach between Ceuta and Cabo Negro, in depths of from 12 to 15 fathoms, but as the bottom is occasionally rocky care should be taken to drop the anchor on sand. The soundings along this part of the coast generally decrease gradually to the shore, except about midway between Ceuta and Cabo Negro, where the 100-fathom line, which extends 5 miles from the shore north and south of that position, runs in a narrow pocket to within 2 miles of the shore.

The whole coast, however, is exposed to easterly winds, and it would be more prudent for a vessel merely seeking shelter from westerly winds to keep under way, standing from point to point, under easy sail, having at night the light at Ceuta as a guide, so as to be ready for the first breeze of easterly wind. With any appearance of an easterly wind it is necessary for vessels at anchor to get under way, as at times it sets in suddenly.

Monte Verde (*Lat. 35° 45′ N., Long. 5° 23′ W.*).—Although low near the coast, the land in the interior is high and broken, with remarkable elevations, such as the Alturas de la Condesa and Monte Verde; the latter, covered with verdure, is conical, 1,345 feet high, and rises near the coast between Ceuta and Cabo Negro, whilst the Alturas de la Condesa are between the Mount and Punta Castillejos.

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Chart 142, Strait of Gibraltar. Var. 14° 20′ W.

The little Rio Capitanes or Azmir runs into the sea south of Monte Verde, but its mouth is obstructed by sand.

Tunny fishery. — Tunny nets are laid out during the season from a position 5 miles northward of Cabo Negro. For Lights, marks, and caution, *see* page 73.

Plan 183, Tetuan bay.

Cabo Negro (*Lat. 35° 41′ N., Long. 5° 17′ W.*), 387 feet above water, projects about a mile to the eastward, and is the termination of the Sierra Bermeja or Tetuan; its extremity is bold, and on it is an octagonal tower. The land of the cape forms several peaks; the highest and most remarkable, named Pan de Azúcar, from its sugar-loaf appearance, is 985 feet high. Cabo Negro will be known by its dark colour, being covered with vegetation, by the tower before mentioned, and by an islet at less than a cable from the foot of its cliffs.

Torre Negro, bearing 315° true.

Anchorage.—On the north side of the cape, and off the elbow of a clean sandy beach, vessels may anchor, in case of necessity, for shelter from winds a little eastward of south, but they should leave immediately there is any appearance of an easterly wind.

TETUAN BAY.—A clean sandy beach, nearly straight, extends from the high land of Cabo Negro, in a southerly direction, 8 miles, to Punta de Mazari, and is known as the Playa de Tetuan. The depth of 5 fathoms is generally about half a mile from the shore, and at a mile the soundings are from 12 to 16 fathoms, over sand and gravel, with patches of rock. A shoal, with 4 fathoms over it, lies about half a mile from the shore, one mile northward of the entrance to Rio Martin. The only rocks along this extensive beach are between Rio Martin (Tetuan) and Punta de Mazari (Tetuan); they extend 2 cables from the shore, and the bottom in the vicinity is also rocky.

The coast is formed of low sandhills covered with scrub, on the highest of which, at 2¼ miles southward of Cabo Negro, is a white two-storied building, surrounded by high white walls, 127 feet above high water. The land ascends gradually to the interior, forming the plain of Tetuan.

Tetuan bay, from north-eastward.

General charts 3578, 773, 2717, 1, 2158a, 449.

Plan 183, Tetuan bay. Var. 14° 10′ W.

Anchorage (*Lat. 35° 38′ N., Long. 5° 14′ W.*). — Vessels may anchor off the river, in any convenient depth, with all winds except those from the eastward; and the left corner of the fort in line with a fairly conspicuous building, on the side of the hill just above the town, bearing about 246° true, is said to be a good mark, but rocky ground exists about 1½ miles eastward of the river, and the nature of the bottom should be ascertained before anchoring. There is good anchorage with the tower on Cabo Negro bearing 326° true, and the farmhouse bearing 233° true, distant about 1¾ miles. The bottom in this vicinity appears to be more clear of rocky patches than elsewhere. The swell invariably indicates the approach of easterly winds, when vessels should leave immediately.

Large sailing vessels, seeking shelter at night from south-westerly or westerly winds, should not go inside the line between Ceuta and Punta de Mazari, so as to avoid getting into the bight of the coast, in the event of an easterly wind setting in suddenly, which in winter it frequently does; a bearing of Ceuta light will be a guide, but the lead should not be neglected.

Directions. — The mountains westward of Tetuan form several remarkable peaks, and are seen from a great distance; but those to the southward being higher will be first distinguished. On nearing the coast, the white sandy beach north and south of Cabo Negro is very distinct in contrast to the dark land of the cape, the sugar-loaf hill and the white tower of the cape, the white town of Tetuan, and finally, the custom-house and fort at the entrance of the river will be seen.

Tides. — It is high water, full and change, at Rio Martin, at IIh. 23m.; springs rise 2½ feet, neaps 1½ feet.

Tidal streams. — Between Ceuta and Punta Adelau the tidal stream assumes the direction of the coast, but it is not usually strong; it sets northward and southward, with in-shore counter streams; and at a distance not easily defined, the current always runs eastward.

From observations made in Tetuan bay during 1908 the tidal streams are found to be weak in force, uncertain in direction, and largely influenced by the wind. During a prevalence of light winds or calm weather the tidal stream generally sets to the northward from 5 hours after high water to one hour before high water.

The stream invariably runs strong round Cabo Negro, forming a small race which sometimes extends a mile eastward of the cape.

Landing place. — Tetuan is the only port on the coast of Marocco, eastward of Ceuta, at which landing is permitted; the best landing place is just southward of Pinnacle point, and rather more than a mile from Cabo Negro; landing is generally impracticable dur-

General charts 3578, 773, 2717, 1, 2158a, 449.

Plan 183, Tetuan bay. Var. 14° 10′ W.

ing easterly winds, but it is sometimes possible in one of the small rocky coves close westward of Cabo Negro.

River. — Rio Martin (Tetuan) (the Wad-el-Julú of the Arabs) runs into the sea 4 miles southward of Cabo Negro, and is navigable for vessels of light draught to a distance of 4 cables above the Custom-house, or about 1½ miles from the coast. The sands at the entrance shift, and at low water, spring tides, there is a depth of about 3 feet on the bar, and the rise of tide being 3 feet, it is only under favourable circumstances that the bar has 6 feet water over it, except after rains, when there is sometimes a depth of 12 feet; the passage is narrow, the sea breaks on the bar with the least swell, and occasionally it is dry in summer.

Within the bar there are depths of from 6½ to 7½ feet along the north shore by the fort, a square white building with a tower at each corner, and having a flagstaff, about 3 cables from the entrance; the Custom-house, a large grey building, stands on the north bank of the river, about a mile from the entrance.

Town (*Lat. 35° 35′ N., Long. 5° 23′ W.*). — The town of Tetuan (Tet-taguen of the Arabs), about 7 statute miles from the coast, stands on the declivity of a hill, surmounted by a square castle, and is the residence of the Governor; it is of considerable extent, and its walls are flanked in different parts with square forts. The streets are narrow, the houses are frequently of two stories, white, and tolerably well built, and there are several mosques. A British Vice-Consul is resident.

In 1910 the population was estimated at 30,000, of whom 22,000 were Moors, 7,500 Jews, and 500 Europeans (25 British subjects).

Communication. — There is fortnightly communication with Tangier and Gibraltar by a French line of steamers, Cie de Navigation Mixte.

An occasional steamer of M. H. Bland & Co. of Gibraltar calls. The Spanish line, Correas de Africa, between Barcelona and the Canaries, calls about once a fortnight; and a German line calls about every three weeks on way to Melilla.

Supplies.—Fresh beef and bread may be obtained, twenty-four hours' notice should be given, but vegetables are not always procurable. Water may be obtained from a stream in Beni Said, but vessels must find the means of transport. No coal is imported.

Trade. — The exports, consisting principally of oxen, almonds, eggs, oranges, linseed, slippers, and wax, in 1910 amounted in value to £19,537; and the imports of manufactured cottons, sugar, silk, flour, woollen goods, soap, and tea to £44,326.

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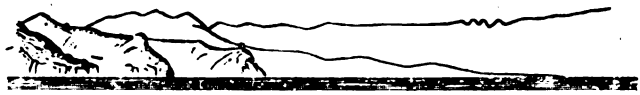
Plan 183, Tetuan bay. Var. 14° 10′ W.

Shipping.—In 1910, 318 steam vessels, with a total tonnage of 132,566 tons, entered the port, and 145 sailing vessels, with a total tonnage of 2,616 tons.

Punta de Mazari (Tetuan) (*Lat. 35° 33′ N., Long. 5° 14′ W.*) is high, with nearly perpendicular red cliffs, and on it is a white tower 30 feet high, and the top is elevated about 390 feet above the sea. When seen from the northward the tower appears to be situated between wooded tableland. The coast adjoining the cape is high and dark, being covered with vegetation, but an occasional red patch is seen when lighted up by the sun. The shore of the bay is much cultivated, and the migratory Arabs appear to be friendly.

Torre Mazari, bearing 250° true.

The eastern extreme of Cala Mazari is named Punta Caverner, from a break in the cliff in the form of a cave, and which is more remarkable when seen from the westward. The cliffs are formed of a reddish rock, the land above them being high, like Punta de Mazari, and covered with brushwood.



Punta Caverner. *Punta de Mazari, bearing 306° true.*

A narrow valley running through high land is seen eastward of Punta Caverner, terminating at the sea in a small curved beach about 4 cables in length eastward of which there are cliffs of grey rocks with red patches, produced by ferruginous matter, which is common on this part of the coast.

Punta de Mazari, Punta Caverner, and points to the eastward of the beach have rocks above and below water, extending off for about half a cable, otherwise they are bold and clear of danger, and there are depths of from 17 to 20 fathoms, over sand and rock, at less than a mile from the shore.

Anchorage.—The anchorage is safe with all off-shore winds, but, as at Tetuan bay, it is necessary to leave in the event of any sign of an easterly wind. A convenient anchorage for a large vessel is in 16 fathoms water, over sandy bottom, with the tower on Punta de Mazari bearing about 227° true, distant 8 cables, but any other berth may be chosen, except that in a less depth than 14 fathoms the holding ground is not so good, and with Punta de Mazari bearing less than 190° true the bottom is rocky.

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Plan 183, Tetuan bay. Var. 14° 10′ W.

Water.—The sandy beach is thrown up by the sea like an embankment, and behind it is a lagoon about 250 yards in length, which is continually fed by a stream running down a valley; it is capable of furnishing an abundant supply of water even in the dry season of the year.

The water is obtained with the greatest facility, either by filling the casks in the boats with engines or starting hoses, or by landing and rolling the casks over the beach to the water.

Chart 2717, Cape Spartel to Cape Ferrat.

Punta Adelau (*Lat. 35° 31′ N., Long. 5° 11′ W.*).—Beyond the cliffs already mentioned is another small white beach, terminated eastward by Punta Adelau, close to which are some dark steep rocks. A river runs through a deep valley into the sea, and the land, over the middle of the beach, rises rapidly to the mountains of the interior.

Coast.—South-eastward of Punta Adelau are several sandy beaches, separated by high rocky points of a dark or reddish colour, and projecting but little; in the interior the land is high, covered with vegetation, and rises to 2,920 feet above the sea at about 5 miles southward of Punta Adelau.

Punta Omare is the most remarkable of these points, and is situated 5½ miles from Punta Adelau, it terminates in a sudden slope with an islet at the foot, and has a tower on it, and from the westward presents a fissure which is distinct, and separates its extremity from the high land near it; the tower, which is white, is conspicuous in contrast to the dark green land adjacent. The only remarkable objects on the land a little eastward of the point, are a white tower, an isolated house, and a village.

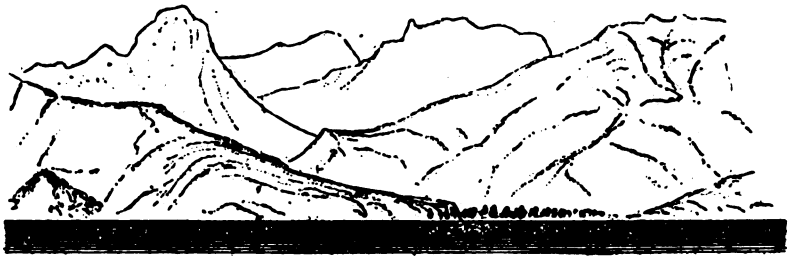
Rio Omare.—At 3 miles to the southward of Punta Omare the river, of the same name, falls into the sea through a long white sandy beach, fronting an extensive valley surrounded by elevated land; it discharges a considerable quantity of water, but the bar appears to be impracticable. The beach is nearly straight, the land of the valley low, with some trees near the shore.

Anchorage.—Under favourable circumstances there is anchorage off Playa de Omare, the shore being clear of danger.

Monte Anna.—The coast is backed by a high range of mountains, the summit of which, Monte Anna, is 7,219 feet high, and lies south-westward, distant 11 miles from Punta Omare. The mount is easily distinguishable by its isolation and reddish colour, and forms part of the chain which follows the line of coast, passing Tetuan and

Chart 2717, Cape Spartel to Cape Ferrat. Var. 14° W.

terminating in the Sierra Bullones. During easterly winds the mount is obscured.



Monte Anna, bearing 252° true. *Playa de Omare.*

Punta Cotelle.—At the eastern termination of Playa de Omare the coast becomes high, and in the middle of the cliffs is a white sandy patch of a triangular form; then follows Punta Cotelle, on which is a round white tower. At a short distance from the foot of the point are several detached rocks and an islet, which latter may be seen from some distance.

Banco Cotelle, eastward of Punta Cotelle, is rocky, extends about 1½ miles from the coast, and has 5 feet of water over it, and 3½ and 4½ fathoms between it and the shore, a vessel should therefore give the point a berth of 2 or 3 miles.

Mersa Ustrak (*Lat. 35° 23′ N., Long. 5° 0′ W.*) is a small bay with a sandy beach on the eastern side of Punta Cotelle, the beach fronts an extensive valley, thickly inhabited. On the western hills is a marabut tower, also some houses, and to the eastward is an elevated projecting headland, on which are the ruins of a large ancient fortification, the largest extent of which faces the north-west.

Near this fortification is another marabut tower in the midst of cultivated ground, and in the interior, on the slope of the hills, the large town of Ustrak appears at a distance, like a large red patch; the marabut tower is seen from some distance.

A high steep point slightly projecting, and surrounded by black rocks, separates Mersa Ustrak from a white beach eastward of it, off which Blanco Cotelle terminates.

Village. *Torre Cotelle, bearing 217° true.*

Mersa Ustrak.

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Chart 2717, Cape Spartel to Cape Ferrat. Var. 14° W.

Coast.—From this beach the coast continues to the south-east, and is nearly straight for 5 miles to the north-west extreme of Ensenada de Alamos. All along this stretch there are small sandy beaches separated by rocky points with off-lying rocks; one of the latter, seen from the north-west in the form of a pyramid, is remarkable.

The land, though high and broken in the interior, becomes gradually lower towards the coast as Ensenada de Alamos is approached. The only buildings between Ustrak and Alamos bays are the ruins of a tower on the top of a cliff and the marabut of Sidi Selim on the western point of Ensenada de Alamos; this latter point is a rocky, reddish coloured headland with a long level summit.

Ensenada de Alamos, south-east of the point above mentioned, will be known from a distance by the large trees in the valley, by a marabut tower standing on a hill near the coast in the western part, and by Torre Ali, on the southern side, white, on a rocky and slightly projecting point.

Another white marabut tower may be seen in the interior on a hill over the valley, and more to the southward is the town of Fagaza, on the bank of the Rio Alamos, which flows through the plain.

Torre Ali *Marabut tower, bearing 205° true.*

Anchorage. — The shore of Ensenada de Alamos is a sandy beach, and a vessel may anchor off it in fine weather; at the distance of a mile from the beach there are 22 fathoms water, over sandy bottom.

Jagerschmidt point (*Lat. 35° 18′ N., Long. 4° 51′ W.*).—From Torre Ali, south-eastward to Jagerschmidt point, the coast rapidly becomes higher, with broken, rocky, and nearly inaccessible cliffs, and small sandy beaches; the cliffs appear in triangular red patches. Jagerschmidt point, distant 10½ miles south-eastward of Punta Cotelle, is dark, round, and salient, and Jagerschmidt mountain, about 4 miles south-west of it, attains an elevation of 4,363 feet above the sea. The point may be known by two small islets off it which are visible in all directions, and to the westward of it there is a small beach with some scattered black rocks.

Wadi M'ter.—From Jagerschmidt point, the coast is high, cliffy, and skirted at a short distance by rocks for a distance of 4 miles, as

Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 50′ W.

far as Mersa M'ter; the cliffs are nearly vertical, and the sea washes their base. The little bay of M'ter has a beach where the river of the same name runs into the sea after winding through a deep, narrow valley. The land in the interior rises to upwards of 3,000 feet above the sea.

Sidi Attar. — Three miles eastward of Mersa M'ter is Mersa Sidi Attar, which derives its name from a handsome white marabut tower, standing on the coast surrounded by small trees and shrubbery, near the little Wadi Tarsa, which runs into the sea between the marabut and a tower on a height farther south. A town, which from a distance appears like a white patch, is seen on the slope of the hills in the interior.

Monte Scovasso, 3 miles in the interior, is an excellent mark for this part of the coast; it is 4,265 feet above the sea, and remarkable from a break or cut in its summit.

Monte de la Sierra — *Monte Scovasso, bearing 202° true.*

Ensenada de Pescadores (*Lat. 35° 13′ N., Long. 4° 41′ W.*). —The bay of Sidi Attar is succeeded by high land with vertical cliffs, at the foot of which here and there are small portions of beach, then follows Ensenada de Pescadores on the west side of the point of the same name; it is semicircular, with a sandy beach, and fronts a deep, narrow valley, through which the Wadi Uaringa flows.

The bay is bounded on the west by Monte Scovasso, and on the east by Monte de la Sierra, which derives its name from the serrated appearance of its western part; from the westward, this mountain is not clearly defined, but is easily recognised when Monte Scovasso bears 180° true.

Ensenada Pequeña. — *Monte de la Sierra.* — *Monte Scovasso. Ensenada de Pescadores.*

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Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 50′ W.

Anchorage.—Ensenada de Pescadores affords anchorage, in fine weather, sheltered from winds from East, round by South, to W.S.W., but the inhabitants are hostile.

CAUTION. — The Wadi Uaringa is considered to be the line of division between the provinces of Tetuan and Riff; the former includes the coast between Cabo Negro and the Wadi Uaringa, and the latter between that river and the Wadi Skiss. The inhabitants of the coast of Tetuan are less warlike or hostile, and more submissive to the authorities of Marocco than those of the Riff coast; vessels therefore approach the former coast with more confidence than the latter.

Local current.—The general easterly current experienced in the middle of the channel inclines more to the south-eastward as the coast of Riff is approached, and off Cabo Tres-Forcas, the most salient point, the edge of this south-easterly current is close to the shore, and thus affecting sailing vessels, subjects them to the risk of attack from Riff pirates.

A sailing vessel entering the Mediterranean and steering to pass midway between Cabo Tres-Forcas and the island of Alboran, when on the meridian of Velez de la Gomera or Alhucemas, may be becalmed and insensibly drifted towards Cabo Tres-Forcas.

And a similar result may occur, on this coast, in working against westerly winds, as should it fall calm the vessel will be subject to the drift of the south-easterly current.

The south-easterly current striking against the land of Cabo Tres-Forcas causes a counter current to the westward which, at a short distance from the coast, runs in a general south-westerly direction from the cape as far as Velez de la Gomera, when it trends round to the westward and northward to Ceuta (*see* page 54). Hence a vessel becalmed westward of Cabo Tres-Forcas meets with a westerly current, and is drifted to the south-westward along the coast.

During summer, calms are frequent on the Riff coast, and if a breeze springs up it is generally light, from the eastward or south-eastward although a fresh levanter may be blowing in mid-channel. At times a sea from the north-eastward assists to drift vessels, when becalmed, towards the land, another reason why this coast should not be approached. Sailing vessels should not be southward of the parallel of the strait.

Punta de Pescadores (*Lat. 35° 13′ N., Long. 4° 40′ W.*), 10 miles south-eastward of Jagerschmidt point, is salient and rocky, and when seen from the east or west appears like an island. It is not so high as the land from which it projects, and is one of the most remarkable points on the coast, its steep cliffs being dark with red patches, and its rugged outline terminating in a rocky peak in the

General charts 1, 2158a, 449.

Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 40′ W.

form of a tower; an isolated rock lies at the foot of the point. In the middle of its north front is a circular cove, Ensenada Pequeña, with a narrow entrance affording shelter for boats. *See* view on page 295.

Punta de Pescadores and Monte Scovasso are good marks for all this part of the coast, the break or cut in the latter is not perceptible when it bears westward of 235° true; when the break is in sight a vessel will be westward of the meridian of Punta de Pescadores, and when it is shut in, to the eastward.

Ensenada de Traidores.—To the eastward of Punta de Pescadores there is a fine, sandy beach, and then appear cliffs, which diminish in height as far as the west point of the little bay of Rocas Negras. The beach of this bay is foul, with black rocks on its eastern part, from which it probably derives its name. Ensenada de Traidores occupies about 4 miles of coast, nearly straight, and of moderate height. There is a large valley in the interior, bounded by elevated land, and the town of Bab, which appears to be of some extent, is seen in the midst of the cultivation which covers the plain.

The west point of the bay is a cliff with a high hill above it, and the east is formed by the termination of the hills which bound it on that side.

Cala de Mostaza. — At 11½ miles eastward of Punta de Pescadores is a tower on the western point of Cala de Mostaza; the tower is white and round, but not so remarkable as that of Attar. The coast becomes lower towards the point, which is rocky and declines gradually to the sea. The bay is a mile across, of little depth, and affords no shelter except with off-shore winds; the bottom is coarse gravel. On the eastern side are several white houses surrounded by cultivation. The town of Mostaza, which stands on the left bank of the river of the same name, is 3 miles inland in a southerly direction from the point.

Cala de Iris (*Lat. 35° 9′ N., Long. 4° 22′ W.*). — The western point of Cala de Iris is situated 2¼ miles south-eastward of Cala de Mostaza, the coast between being dark, rocky cliffs, with red patches. The point, formed of steep, white, rocky cliffs, has, at its foot, two isolated rocks a short distance apart; one is white, pointed, and tolerably high, the other low and level. When there is any swell the sea breaks near these rocks on a reef nearly awash, which extends to the northward. This reef, with Isla Iris on the east, forms the entrance to a small bay in the shape of a horse-shoe, with two beaches separated by a rocky point, near which are two white pinnacle rocks connected to the point by a reef.

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Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 40′ W.

Isla Iris. *Cala de Iris.* *Piedra Blanca, bearing 132° true.*

Isla Iris, about 285 yards in length, north and south, 155 yards in breadth, and 282 feet high at its northern end, slopes to the south and west, and when seen from east or west appears in the form of a wedge. It lies 1½ cables from the coast, and is connected to it by a reef, the deepest water on which is from 4 to 5 feet. The bottom is fine sand, with 3½ and 8 fathoms near the islet, decreasing to 14 and 17 feet at about 30 yards from the shore.

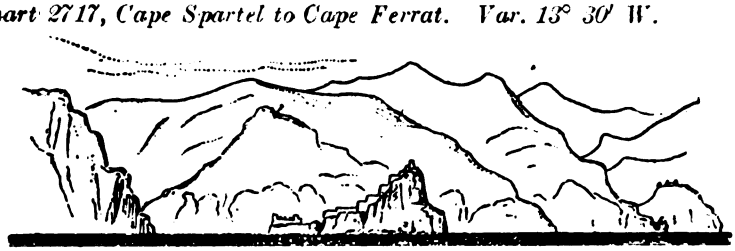
Anchorage. — Small vessels lie between the islet and the point, which separate the two beaches, with an anchor seaward and a cable to the islet. The space is confined, and the anchorage can only be used in fine weather, as it is open from N.E. to N.W., from which quarter the winds and sea are dangerous; the inhabitants also of the country are hostile, and fire on the crew of a vessel whenever they have an opportunity.

Vessels running along the land may easily distinguish the islet by its white cliffs which are nearly vertical and face the north-west, and by its arid appearance; but at a distance from the north or north-west it is blended with the cliffs of the coast. From a long distance seaward, in clear weather, two remarkable peaks to the south-west are good marks for the bay, particularly the eastern, which is 5,845 feet above the sea, and bears about 200° true, distant 9½ miles from the islet.

Ensenada de Alcalá (*Lat. 35° 10′ N., Long. 4° 20′ W.*).—The coast for 1½ miles eastward of Isla Iris is formed of cliff, and terminates in a headland nearly circular, on which are the ruins of Castillo de Alcalá, having four towers. Three of the towers are visible from the sea, the other is towards the land, but they are all in ruins. The headland is of moderate height and remarkable from the yellow coloured cliffs of which it is composed; it forms the west point of Ensenada de Alcalá, which is of a moderate depth, with a clear beach, where the Spanish troops landed on the 2nd September, 1564, at the capture of Velez de la Gomera.

General charts 1, 2158a, 449.

Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 30′ W.



Cabo Baba. *Penon de Velez de la Gomera.* *Torres de Alcalá.*

A rivulet runs into the bay, and in the vicinity are a number of houses, the land being cultivated and well wooded. The town of Badis is not far from the bay.

Peñon de Velez de la Gomera is situated 2 miles eastward of Ensenada de Alcalá, the coast between being high and rocky, with nearly perpendicular cliffs, having several islets or rocks at a short distance. The Peñon de Velez de la Gomera, known also as the Isla de San Antonio, appears in a conical form, and its north part, on which is a battery, is 253 feet above the sea.

The Peñon is connected to another islet by a rocky ledge, lying in an east and west direction, and together are 420 yards in length. The fortifications which form the fortress of Velez de la Gomera, one of the minor possessions of Spain on the coast of Africa, stand on the south-western slope of the island, and present a white picturesque appearance formed by batteries, magazines, and other buildings. The inhabitants, including the garrison, who number about 400, obtain provisions from Malaga and a few refreshments from the Moors.

LIGHT (*Lat. 35° 10′ N., Long. 4° 18′ W.*).—On the Peñon, to the north-westward of the town, a white tower, 18 feet in height, exhibits, at an elevation of 154 feet above the sea, a *group flashing white* light, every *twenty-five seconds*, which shows *three* short flashes, thus:—flash, eclipse, *five seconds;* flash, eclipse, *five seconds;* flash, eclipse, *fifteen seconds:* it is visible in clear weather from a distance of 16 miles.

Communication.—There is regular communication, by steam vessels, with Malaga, also telegraphic communication.

Water is obtained from tanks.

Ensenada de Velez de la Gomera.—Between the Peñon and Cabo Baba, a distance of a little over a mile, the coast forms a bay, having a clean sandy beach, about 3½ cables in extent, with easy landing. The Rio Vega runs through the beach to the sea.

Submarine telegraph cables.—There is a telegraph cable to Ceuta, and another to Alhucemas; the directions of the cables are indicated by circles painted red and white on the shore, and vessels should avoid anchoring near them.

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Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 30′ W.

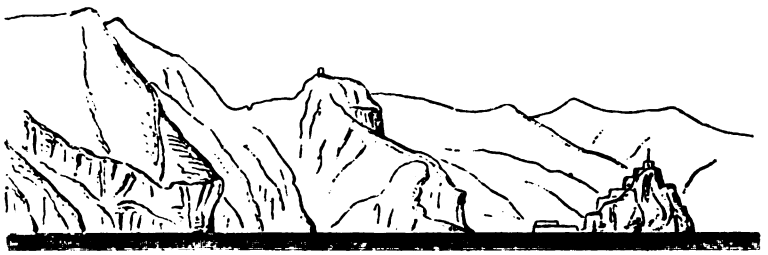
Anchorage.—The anchorage is indifferent, even in summer, and affords shelter only to small vessels in 1½ to 3¾ fathoms water, over sand and gravel, between the islet and the shore, but there is no room for a vessel of moderate size, even if secured head and stern, the channel being only half a cable wide. The feluccas which trade between this place and Spain lie in about two fathoms water, with the heaviest anchor to the westward.

The depth is decreasing, in consequence of the freshets of the Rio Vega, which runs into the sea eastward of the anchorage, and also from the accumulation of sand thrown in by the sea, and the on-shore winds, even in summer, send in a heavy sea about the Peñon, and on the coast between Ensenada de Alcalá and Cabo Baba.

A vessel of moderate size in fine weather wishing to communicate with the fortress, will find temporary anchorage eastward of the Peñon between it and Cabo Baba, off the Playa de Vega. The Peñon is steep-to, and a vessel from the eastward with winds from the north-eastward may pass it at a convenient distance; the western entrance of the channel between it and the shore is the wider, and has depths of from 12 to 14 fathoms.

At times the wind falls light on nearing the bay, when sailing vessels may depend on the assistance of the guard boat; the pilot boat will go off should a vessel approach the anchorage. Should a vessel be set to leeward of the Peñon during easterly winds by strong westerly currents, the anchorage of Iris may be resorted to, but it can only be used for temporary purposes, and should be quitted as soon as possible. The mariner should be carefully on his guard and not trust the Riffians, the Peñon de Velez de la Gomera being the only friendly place.

Cabo Baba (*Lat. 35° 10′ N., Long. 4° 14′ W.*), about three-quarters of a mile to the north-eastward of the Peñon, is a high, dark, ferruginous cliff, nearly vertical, with the remains of a marabut tower on it, and from the eastward a large break will be seen in the land forming it. From the northward it scarcely seems to project, but is conspicuous from the Ensenada de Velez.



Fronton del Remolon. *Punta Negra.* *Cabo Baba, bearing 205° true.* *Peñon de Velez.*

General charts 1, 2158a, 449.

Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 30′ W.

The land eastward of Cabo Baba is high, steep, and broken, with whitish patches. Many of the cliffs rise vertically from the sea, with small sandy patches here and there strewed with black rocks, and parts of the coast appear straight, interrupted occasionally by a salient point. The first of these points, named Negra, is not very remarkable, and to the west of it is Islote Quemado.

Currents.—The current off Cabo Baba runs strongly to the westward, and attains a rate of 2 knots an hour. In Ensenada de Velez de la Gomera the currents are irregular and embarrasing to vessels lying there.

Roca Quemado, nearly 2 cables eastward of Cabo Baba, and a cable from the coast, has about 3 feet water over it, and is only dangerous to small vessels which go near the coast. A little more to the eastward is Islote Quemado, which is difficult to distinguish from the coast.

Punta Jalú (*Lat. 35° 13′ N., Long. 4° 11′ W.*).—Another point follows that of Negra, named the Fronton del Remolon, which seen from the eastward, presents a series of high and nearly vertical cliffs; the coast eastward continues high, rocky, and bold, with cliffs to the water's edge, and 3 miles from Fronton del Remolon are two islets named Topo lying off a rocky point. Punta Jalú, about 6 miles beyond Cabo Baba, is rocky, high, steep, and remarkable, and has an islet off it.

Monte Mellona.—The first building seen eastward of Cabo Baba is a white house named Gitanos, standing on the summit of a mountain, the ridges of which descend to the sea. Farther eastward is another white house on a height near the coast and eastward of the house, Monte Mellona, rising 1,225 feet above the sea, has a white marabut tower on its summit; there are also several white houses scattered along the coast.

Beyond Monte Mellona the coast gradually decreases in height, but presents a continual wall of vertical rocks, without a vestige of beach, whilst the high land in the interior preserves the character of the Riff mountains, being high, broken, and nearly inaccessible.

CAUTION.—Sailing vessels should give this coast a wide berth. The winds between N.W. and N.E., which at times are fresh at a distance of 2 or 3 miles from the coast, occasionally become light and variable, neither allowing a vessel to reach the offing, nor counteracting the effect of the sea, which has a tendency towards the land; and the water is too deep for anchoring.

Punta de Bosicu, nearly 13 miles eastward of Cabo Baba, projects, and westward of it is the cove of the same name, about half a

Chart 2717, Cape Spartel to Cape Ferrat. Var. 15° 20′ W.

mile wide at the entrance and 4 cables deep, with three small beaches; a small river runs into the cove. The two points of entrance are surrounded by black rocks, the eastern being the higher.

Punta de Bosicu will be known by a conical hill over it, on which is a small white house or marabut, best seen from the eastward. The cove, open to the northward, and available for small vessels only, is of little use in consequence of the hostility of the natives.

Plan of Alhucemas bay on 1692.

Morro Nuevo (*Lat. 35° 15′ N., Long. 3° 54′ W.*)—From Punta de Bosicu the coast, for 5 miles in an easterly direction, is formed of cliffs of moderate height, lowering gradually as far as Punta de los Frailes, which has some rocks a short distance from it. This point, neither remarkable nor projecting, is followed by the Morro Nuevo, a headland of high, white, and yellow cliffs, with patches of ferruginous rock, presenting its largest face to the north-eastward, easily recognised; it is the western extreme of Bahia de Alhucemas.

Morro Nuevo. *Montana de Malmusi, bearing 111° true.*

Montana de Malmusi, 1,083 feet above the sea, rises about 2 miles south-east of the Morro Nuevo, slopes to the shore of Bahia de Alhucemas, and is a good distant mark. There is a break or gap in its summit seen from all directions seaward, except when it bears about 180° true. To the southward, and not far from it, is another mountain, Monte Hendido, with a similar break, which may be mistaken for it. A little to the westward of the mount is a white cliff at the foot of which is a little beach and a house, best seen when it bears about 190° true; the cliff is visible at a considerable distance.

Monte Hendido. *Montana de Malmusi, bearing 182° true.*

BAHIA DE ALHUCEMAS, formed between the Morro Nuevo and Cabo Quilates, 8 miles to the eastward, is 4½ miles deep, bounded on either side by high mountainous land, but at its head low, flat, and forming an extensive plain, from which two rivers run into the sea, through a fine beach, which occupies the whole of the

Plan of Alhucemas bay on 1692. Var. 13° 20′ W.

head of the bay. Next to the Zafarin islands, this bay affords the best shelter on the north coast of Marocco.

Presidio de Alhucemas, a fortified islet in the south-western part of the bay, about 2½ miles, south-eastward from Morro Nuevo and 7 cables from the beach, is about 165 yards in length in a westerly and easterly direction, 75 yards in breadth, and 90 feet above the sea at its north end; it is nearly covered by fortifications and buildings, belongs to Spain, and contains a population, including the garrison, of about 320.

Presidio de Alhucemas is steep-to, except the north-western part, off which at nearly half a cable is a pinnacle rock with 14 feet water over it. Its northern and eastern sides are rocky, and so much undermined, that in north-easterly gales the sea runs into the caves and crevices at its foot with such force and noise as to cause the islet to vibrate as if it were being washed from its base. It is seen from a great distance in consequence of the white appearance of the buildings.

Isla de Tierra, low and rocky, lies about a quarter of a mile north-west of Presidio de Alhucemas, and Isla de Mar, another small islet, lies off its northern extreme, to the south-eastward of which there is a rock with one foot water over it.

Lighthouse, bearing 228° true. *Cerro de las Palomas.*

Bahia de Alhucemas.

LIGHT (*Lat. 35° 13′ N., Long. 3° 53′ W.*). — On the summit of Presidio de Alhucemas is a white look-out tower, 34 feet in height, which exhibits at an elevation of 122 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 10 miles.

Coves. — On the south side of the Morro Nuevo, and between it and a high rocky head named Morro Viejo, is a cove, Cala Quemado, with a sandy beach and three islets, where small vessels will find shelter from westerly winds. Between this cove and the fortress are other coves, separated by points formed by ravines and broken land. Monte Malmusi with its gap, and southward of it Cerro de las Palomas, high and remarkable, are guides to the anchorage.

Submarine telegraph cables.—There are single telegraph cables from Alhucemas to Peñon de Velez de la Gomera and Melilla, and telegraphic communication with Almeria.

General charts 217, 1, 2158a, 449.

Plan of Alhucemas bay on 1692. Var. 13° 20′ W.

Buoy. — The cable-house is situated at the extreme west of the south front of the plaza, and a buoy is moored in about 20 feet water, about 30 yards from the shore, to indicate the position of the cable.

Rios Incor and Guis. — The Playa de Alhucemas, which is more than 6 miles in extent, occupies the greater part of the shore of the bay, and forms the limit of the extensive plain on the south, through which the Rios Incor or Alhucemas and Guis or Grande run into the sea: the beach is clean and the landing easy. The plain is well peopled and numerous houses stand in the midst of cultivated land.

Landing.—*See* page 16.

Anchorage (*Lat. 35° 13′ N., Long. 3° 51′ W.*), in fine weather, may be obtained eastward of the Presidio de Alhucemas, in 7 or 8 fathoms water, over sand and mud, with good holding ground; but as strong on-shore winds send a heavy sea into the bay the anchorage must be left with any sign of wind from seaward.

With easterly winds shelter may be found in the eastern part of the bay, and with westerly winds in the western part. Off-shore winds seldom blow except when the land is wet; they begin about 11 or 12 at night, and continue until 8 or 9 in the morning, when they are succeeded by the sea breeze.

The bottom in the bay is generally sand, and occasionally gravel and soft mud, but is firmer in deeper water and better holding: being rocky in places, the nature of the ground should be ascertained before anchoring. At a mile from the shore there are depths of from 9 to 15 fathoms, which depths gradually diminish to the anchorage; between Morro Nuevo and Cabo Quilates there are from 40 to 56 fathoms.

Small vessels anchor southward of the Presidio, in about 3¼ fathoms water, with a hawser to the island, but the anchorage is dangerous with on-shore winds.

Directions.—Sailing vessels bound to Bahia de Alhucemas generally make Cabo Quilates or the land farther eastward, especially in summer, on account of the westerly current, when light winds are prevalent. At a long distance the bay will be known by the great break in the coast, between the high land over Cabo Quilates and Morro Nuevo, the interior mountains being seen over the low plain.

The Morro Nuevo will be known by its extensive front of whitish cliffs. Cabo Quilates is low and slopes gently to the sea, and the Presidio, appearing as a low black islet, will be recognised by the lighthouse and buildings.

General charts 2717, 1, 2158a, 449.

Plan of Alhucemas bay on 1692. Var. 13° 20′ W.

A sailing vessel from the eastward, with north-easterly winds, should pass Cabo Quilates at the distance of about 3 miles, and then steer for the Presidio. Should the wind be from the north-westward work to windward by short tacks, keeping without the bay, in order to profit by the westerly current. From the westward, Morro Nuevo should have a berth of 3 miles or more, to avoid the light winds and calms near it.

The bay is everywhere clear of danger, and the anchorage may be approached by the lead, but at night care should be taken not to mistake a fire, which may be purposely lighted by the Arabs, for the light on Presidio de Alhucemas.

Currents. — The currents in Bahia de Alhucemas are irregular, and at times run at the rate of a knot an hour, but generally follow the direction of the wind. To the northward of the parallel of the Morro Nuevo the current sets mostly to the westward, but off this headland as well as off Cabo Quilates, there are eddies and counter streams; sailing vessels should therefore give these points a wide berth.

Cabo Quilates (*Lat. 35° 16′ N., Long. 3° 46′ W.*) is the termination of the chain of mountains which form the eastern side of Bahia de Alhucemas. At about 4 miles southward of the cape the land is 1,453 feet high, and slopes to the sea, forming a straight coast which runs northward from the corner where the beach commences.

Chart 2717, Cape Spartel to Cape Ferrat.

Coast. — This part of the coast is composed of cliffs broken by ravines with sandy beaches, and there is seen in the valleys and glens some cultivation, with a few dwellings, the most remarkable being a white house standing on the slope of Monte Renegado. When north of Cabo Quilates, the low cliffs, which terminate at the sea from the high land above them, do not appear, but are distinctly seen from the westward.

A little eastward of the cape is Punta Babazun, the coast between projecting with three ill-defined points, formed by breaks in the land, the most remarkable being that next eastward of the cape, where there is a cove with a dark sandy beach, and a steep black rock near the western extreme of the cliffs. On Mount Confriere, a hill close to and south-eastward of the cape, is a white marabut tower, and near it a group of trees, by which the cape may be known from a distance. The name of Cabo Quilates is assigned to the whole headland between it and Punta Babazun, but the real cape is the eastern extreme of Bahia de Alhucemas.

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Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° 10′ W.

Mount Confriere, bearing 230° true. *Cabo Quilates.*

Cabo Biesta (*Lat. 35° 14′ N., Long. 3° 39′ W.*).—Beyond Punta Babazun the coast becomes higher, with elevated mountains in the interior. About 4 miles south-eastward is Cabo Biesta, which projects but little, and is remarkable only from its form and the cliffs, which have some dark rocks at their base. The intermediate coast is nearly straight, with some beaches, and on one of the hills near the coast is the marabut of Sidi-Chaib. A deep cave in the middle of the yellow cliffs of the point may assist in recognising it.

Coast.—An extensive sandy plain extends south-eastward of Cabo Biesta, backed by dark hills of moderate elevation, which slope rapidly to the sea; the beach terminates with slight interruptions near Punta Abdun, 8 miles eastward. The hills are separated by small ravines which render them remarkable, and, in the interior beyond, are the elevated Riff mountains; on the slope of the hills are the nomadic Arab villages and marabuts; of the latter that of Sidi-Dris is the most remarkable from its whiteness and isolated position, standing on a height of the coast, about 7 miles from Punta Babazun.

The Bahr Bu-Azzun runs into the sea, eastward of this marabut, after winding through a rich plain.

Monte Barcaitzeguy.—The extensive beach before mentioned is broken or subdivided between Sidi-Dris and Punta Abdun, and as the latter is approached the coast becomes higher, being formed by the spurs of the interior mountains, which here draw nearer the coast. The most remarkable is Monte Barcaitzeguy, 2,821 feet high, which rises about 4 miles southward of Punta Abdun, and 2½ and 6 miles south-westward of it are peaks, 3,739 and 4,713 feet high.

Punta Abdun, projecting slightly, steep, and of moderate height, has, to the eastward of it, a cove of the same name, with a sandy beach, through which a small stream runs into the sea. On a small hill close to the coast is a marabut, a little eastward of which, on the cliffs of the coast, is a white wall, and not far from it an Arab village.

Coast. — From Cala Abdun the aspect of the coast changes; the cliffs are frequently marked with veins, and are of a dark red colour, the interior is more elevated and broken, and there is less beach; the

Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° W.

only remarkable one being that of Caleta, 8 miles eastward of the cove.

Lion rock (Roca del Leon) (*Lat. 35° 13′ N., Long. 3° 17′ W.*), 2½ miles eastward of Caleta, takes its name from a similarity it bears to that animal, when seen from certain positions; it lies near the land at the foot of the cliffs.

Monte Milon. *Punta Betoya.* *Mont d'Avranches.* *Lion rock.*

Cala Azanen.—Punta Betoya is 1½ miles eastward of Lion rock, the coast between being rocky; the point is the termination of the hills to the westward, which slope rapidly to the sea, and the west extreme of Cala Azanen. The bay is spacious, about one mile deep, and has a sandy beach, which, commencing at Punta Betoya, is backed by high land.

The most remarkable elevations are Monte Rebagliato, 902 feet high, 2 miles to the southward of Azanen, and Mont d'Avranches, 2,743 feet high, conical and isolated, 6½ miles in the same direction; these mountains, as well as those southward of Cabo Tres-Forcas and the fortress of Melilla, are good marks for the bay.

An extensive cultivated and inhabited plain extends into the interior, and the Rio Queret flows into the sea near the town of Azanen, which stands on the shore. The western shore of the bay is formed by a chain of white sandy downs of no great elevation, which are the only hills of the kind on this part of the coast.

Anchorage.—The bay is exposed to winds from the westward, round by north, to the north-east, but with off-shore winds there is anchorage for a large number of vessels, in from 8 to 10 fathoms water, over sand and mud bottom. The beach is clear and bold, and landing easy.

Punta Negri.—Punta Garet, 4 miles north-eastward of Punta Betoya, is the north-east extreme of Cala Azanen; it is sandy, but not remarkable. Punta Negri, a mile farther in a north-easterly direction, is composed of nearly vertical cliffs, apparently isolated with respect to the adjacent coast, which is much lower, hence, when seen from a distance, its straight and uniform appearance seems artificial.

From a long distance to the northward, the two peaks of Avranches and Rebagliato, and that of Milon, conical, of the same

General charts 1, 2158a, 449.

Chart 2717, Cape Spartel to Cape Ferrat. Var. 13° W.

height as Mont d'Avranches, and 4 miles south-eastward of it, may be recognised.

Cala Zera. — From Punta Negri the coast trends to the eastward for about 2½ miles, and then to the north-eastward, forming Cala Zera, with beaches interrupted by rocky points, the only remarkable object being a white marabut at the head of the bay.

The coast from Cala Zera trends to the north-east, and is irregular, without beach, and backed by high rugged land as far as Cabo Viejo, a distance of about 11 miles. Some scattered rocks lie at the foot of the cliffs, the most remarkable being Islotes Charranes, distant 7½ miles from Punta Negri.

Cala Betoya, between Cabos Quilates and Tres-Forcas, is 10 miles deep, having midway from 55 to 90 fathoms water, and near the land 15 to 20 fathoms, generally over sand and gravel. The current in the bay usually sets westward following the trend of the coast.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

Cabo Tres-Forcas (*Lat. 35° 27′ N., Long. 3° 0′ W.*), the extremity of a large promontory, terminates in three points, it projects to the northward, and is bold and remarkable. Of the three points, the western, known as Cabo Viejo, is the most prominent, and has a conical black rock at its foot.

Between this point and that next to the eastward is a large cove with high cliffs, one of which, of a yellowish colour, has three deep caverns at its foot. In the inner part of the cove, which is well sheltered, there is a beach, on which a small vessel might be grounded, but for the hostility of the natives.

Between the middle and eastern points is another cove, with a rocky shore but no beach; at the foot of these two latter points there are several islets or rocks. To the eastward of all three points, and separated by a break, is another point which assumes a conical form when viewed from the northward.

Beyond this fourth point, the coast trends to the southward for a short distance to another salient point, at the foot of which is an islet, easily recognised when seen from the northward or southward. All these points project from high lands which terminate in well-defined conical peaks, of a volcanic appearance, from 1,250 to 1,342 feet above the sea.

Cabo Tres-Forcas.

General charts 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 13° W.

LIGHT (*Lat. 35° 27′ N., Long. 2° 59′ W.*).—From a grey wooden building on the second point eastward of Cabo Vieja, is exhibited, at an elevation of 315 feet above the sea, a temporary *group flashing white* light *every five seconds*, showing *two* flashes in each group.

This light is visible in clear weather from a distance of 15 miles. For arcs of visibility, *see* Light list and Chart.

Rock. — A rock, with a depth of one foot over it, lies 2¾ cables northward of the middle point.

Los Farallons. — Off the southernmost of the points are Los Farallons, three islets of no great height; Farallon grande, the northern of the group, is of a dark colour, with a break in the summit.

From the westward Los Farallons will not be visible until open of the fourth point. Between these islets and Melilla are a few small beaches separated by rocky points, the coast is clear of danger, and diminishes in height as Melilla is approached.

Laja Lupiana, on which the sea always breaks, lies about 1½ cables north-eastward from Farallon grande; it is rocky, about half a cable in extent in a north-westerly and south-easterly direction, with 3 feet water over its south-eastern, and 6 feet over its north-western end. Another reef, awash, lies about 1½ cables south-south-westward from Farallon grande.

Between Los Farallons, and also between them and Laja Lupiana, there are 12½ fathoms water, and between Los Farallons and the coast there are depths of from 5½ to 7½ fathoms. The current runs strongly to the north-westward between the islets and in their vicinity, and calms are common under the high land.

Coast. — The coast, between Cabos Tres-Forcas and del Agua, a distance of 32 miles, forms a large bay 10 miles deep, having a low and regular outline, with from 5 to 10 fathoms water at a mile from the shore.

Plan of Melilla on 1692.

MELILLA. — This fortress, the walls and white buildings of which are seen at a distance, is the most important Spanish garrison on the coast of Marocco, and is situated 8½ miles to the southward of the east point of Cabo Tres-Forcas. The town and part of the fortifications occupy a small peninsula or projection, the neck of which

Plan of Melilla on 1692. Var. 13° W.

is a rock about 100 yards in length, rather less in breadth, and about 100 feet above the sea.

Lighthouse, bearing 182° true. *Fuerte del Rosario.*

Melilla.

The length of the peninsula is nearly 500 yards, the northern face being formed of high inaccessible cliffs, but its eastern and southern sides are not so high or so steep. Fuerte del Rosario, on the mainland, north-westward of the peninsula, is conspicuous. The population, including the garrison and convicts, amounted in 1910 to about 12,000.

A small cove with a beach and mole, Muelle Militar, for landing, is on the south side of the peninsula, in front of the gate of the town, and farther eastward is Muelle Florentina, with 5 feet water at its extremity; it is three parts silted up with sand from the Rio del Oro, and can only shelter a few small vessels, but works are in progress for extending it seaward.

Harbour. — A breakwater is in course of construction; it commences about 100 yards southward of Bonete lighthouse, and when completed will extend south-eastward for 300 yards and then south-westward for 220 yards into a depth of about 5½ fathoms. A jetty for embarking minerals is also projected on the south-west side of the town.

Buoys. — The extremity of the breakwater works is marked by a buoy with black and red horizontal bands, surmounted by a topmark formed by two hoops.

A red conical buoy, with a red topmark, marks the extension works off Muelle Florentina.

The buoys are moved outwards as the work progresses.

LIGHTS (*Lat. 35° 18′ N., Long. 2° 57′ W.*).—From Torre Bonete, 43 feet in height, light blue and square, situated north-eastward of the town, a *group occulting white* light showing a group of *two* eclipses *every ten seconds*, thus:—light, *five seconds;* eclipse, *one and a quarter seconds;* light, *two and a half seconds;* eclipse, *one and a quarter seconds;* it is exhibited at an elevation of 131 feet above the sea, and is visible in clear weather from a distance of 10 miles.

A *fixed red* light is exhibited from an iron column on the head of the Muelle Militar, and two *fixed red* lights from the Muelle de Santa Barbara.

From a wooden post, erected close within the outer end of the breakwater works is exhibited, at an elevation of 19 feet, a provisional

Plan of Melilla on 1692. Var. 13° W.

fixed green light, visible from a distance of 2 miles. The light is moved outwards as the work progresses.

Pilots.—Merchant vessels of over 50 tons are compelled to take a pilot. Yachts and merchant vessels of under 50 tons do not pay pilotage dues unless a pilot is employed.

Anchorage (*Lat. 35° 18° N., Long. 2° 57′ W.*).—The anchorage, for large vessels, is between 1½ and 3 miles eastward of Melilla, abreast of Torre Cabras, in from 18 to 25 fathoms water, over mud and sand, with good holding ground; in fine weather a berth may be taken up half a mile from the peninsula, with two white circular bastions on the south side of the town bearing 267° true. The roadstead is sheltered from westerly winds, but vessels should be ready to leave at the first sign of a northerly or easterly wind, and if necessary to slip the cable.

Vessels should not anchor with the lighthouse bearing between 230° and 185° true, as the ground is foul, but with the lighthouse bearing about 270° true.

During summer it is seldom necessary to abandon the anchorage, for although fresh easterly winds may prevail in the offing, they do not blow home to Melilla. Hence, in the fine season, vessels may lie here without any great inconvenience; but in winter, north-easterly winds prevail, and at times are preceded by a heavy sea.

Caution.—When the western side of Monte de Melilla or Caramú is covered with light misty clouds, it is a sure sign of an approaching levanter, or that it is already blowing above the mountain; but if the eastern side of the mount is covered, it is a sign of a westerly wind.

Directions.—Sailing vessels from the Strait of Gibraltar or south coast of Spain, bound to Melilla, during summer, should approach the coast 10 or 12 miles eastward of Cabo Tres-Forcas, so as to counteract the effects of the westerly current, and to be to windward of the cape in case of light easterly winds or calms.

Monte Atalayon, bearing 165° true. *Melilla.*

In fine weather the several heights of the cape, Monte de Melilla, that of Atalayon eastward of it, and Tessan, the highest of the Kebdana mountains to the south-eastward, will be seen.

When approaching from the northward the town is easily recognised by the outline of the fortified peninsula: when approaching from

Plan of Melilla on 1692. Var. 13° W.

the eastward a white fortified tower southward of and behind the town is conspicuous.

Current. — The current in the bight of Melilla sets along shore to the eastward, and thus assists vessels when the wind is from that quarter in weathering Cabo Tres-Forcas.

Storm signals, indicating, to approaching vessels, that the anchorage off Melilla is unsafe, are exhibited from a flagstaff near the lighthouse; the day signal is flag B of the International code, and the night a *red* lantern light.

Communication. — A regular service of steam vessels run between Melilla and Malaga. There is weekly communication between Marseille, Melilla, Algeciras, and Tangiers. There is also telegraphic communication.

Railway.—A short line of railway connects Fuerte Rostro Gordo with the mole, and a line, 15 miles long, is being constructed to the iron mines at Jebel Goiksen.

Supplies.—A small quantity of fresh provisions may be procured; the water, brackish, and not an abundant supply, is obtained from a fountain inside the east port and near the west jetty.

Life-saving apparatus.—A lifeboat and a rocket apparatus are maintained at Melilla.

Submarine telegraph cables.—Melilla has communication by cables with Almeria, Alhucemas, and Zafarin islands.

The telegraph cable is landed in El Galapago, the creek on the north-west side of the peninsula.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

Monte de Melilla (Caramú or Gurugu) (*Lat. 35° 13′ N., Long. 3° 1′ W.*) rises 5½ miles to the south-westward of Melilla; its base is extensive, and the eastern slope approaches the coast, to which it descends in undulating plains, the summit terminating in several peaks, one of which is 3,225 feet above the sea. *See* view page 309. When bearing about 220° true two of the peaks form a saddle. A white marabut tower stands on a hill eastward of the foot of the mountain.

Laguna de Puerto Nuevo.—At 15 miles south-eastward of Melilla is Punta Quiviana: the coast between is low with a sandy beach, and separates the sea from a lagoon of considerable extent named Puerto Nuevo, the water of which is salt, and from it a sufficiency of salt is gathered for the adjacent towns. In 1909 this lagoon was about 15 miles long and 2½ miles broad, with

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 50′ W.

depths of from 4 to 8 fathoms, being separated from the sea by sand-dunes from 10 to 40 feet high, through which two narrow passages allowed small vessels to enter, the northern one by Monte Atalayon and the southern by Restinga de Tofino. It is proposed to dredge one of these channels.

The coast in the vicinity and entrances are liable to frequent changes.

Coast. — Some downs are seen at a distance from the beach partially covered with vegetation. The town of Muley-Ali-Sherif stands at the south-eastern end of the lagoon and Monte Atalayon rises at the north-west end. The latter is a conical hill connected to the slope of Monte Melilla by a small neck of sand.

About 3½ miles to the north-westward of Punta Quiviana is a dark or greyish coloured cliff surrounded by sand, named Restinga de Tofino, with some rocks at its foot, apparently as if fallen from the cliff. The entrance to the lagoon which is here was closed by an earthquake in 1755, but apparently has become opened again.

Punta Quiviana is rocky, and of no great elevation, with some islets near it, one of which is high and conical. The beach before mentioned, of moderate height, continues a little east of the point, then an irregular cliff with small beaches extends to Cabo del Agua.

Depths off-shore.—The depths along this part of the coast at the distance of a mile are from 8 to 13 fathoms; at 3 miles from 30 to 36 fathoms, over sand and mud; and at 10 miles from 82 to 92 fathoms.

Montes de Kebdana or Quiviana. — A chain of mountains of the above name backs the coast between Monte de Melilla and Cabo del Agua, at distances of from 4 to 6 miles; their ridges, sloping towards the coast, terminate in fertile and populous plains which are watered by several streams. These mountains are of different elevations, Monte Tessan, 3,274 feet high, being the most conspicuous.

Monte Berard, about 5 miles eastward of the latter, is conical, 2,250 feet high, and seen from the north-westward its summit forms a saddle.

Cabo del Agua (*Lat. 35° 9′ N., Long. 2° 25′ W.*), from 50 to 65 feet above the sea, level and salient, terminates in nearly vertical cliffs, and has a small height near its extremity on which stands the village of Sidi-Bechir. *See* view on plan 1692.

Plan of Zafarin islands on 1692.

ZAFARIN ISLANDS (Chafarinas) (*see* view on plan), a group of three islands belonging to Spain since 1847, lies nearly 2 miles northward of Cabo del Agua. The western, named Congreso, is the largest, being half a mile in length north and south, a quarter of a mile in breadth, and 440 feet high. It is uneven, with remarkable cliffs on its west side, and a tortuous beach on the south-west. In fine

Plan of Zafarin islands on 1692. Var. 12° 50′ W.

weather it is seen from the anchorage at Melilla, and appears like a cask floating on the water.

Zafarin islands bearing about 135° true, distant 6 miles.

Landing may be easily effected on the east coast of the island, at the foot of a small path leading to a house halfway up the hill.

Isla de Isabel Segunda, about 3½ cables eastward of the above island, is 130 feet high, flat, and the only inhabited one of the group, having a population of about 300. Several batteries and buildings have been erected on it, the most conspicuous of the latter being a church and clock tower.

LIGHTS (*Lat. 35° 11′ N., Long. 2° 26′ W.*).—Near the north-west extreme of Isla de Isabel Segunda is a white square tower 62 feet in height, with brick cornices and surmounting a dwelling house, from which is exhibited, at an elevation of 170 feet above the sea, a *fixed and flashing white* light, *every thirty seconds* which is visible in clear weather from a distance of 18 miles, but is obscured by Isla Congreso.

On the outer end of the mole on the south side of the island a *fixed red* light is exhibited at an elevation of 20 feet above the sea; it is visible in clear weather from a distance of 2 miles.

Mole. — From the eastern side of the south extreme of Isla de Isabel Segunda a mole, 15 yards in width, extends 171° true for a distance of 90 yards.

Isla del Rey, the most easterly of the three islands, and joined to Isla Isabel Segunda by a causeway (Rompeolos) one cable long, is 4½ cables in length, about 1¼ cables at its greatest breadth and 112 feet high; the coasts are irregular and indented and its eastern side is cliffy. The islands are occasionally visited by vessels with supplies for the garrison; rain water stored constitutes the only supply.

Danger. — Between Islas Congreso and Isabel Segunda there are from 7 to 13 fathoms water, but a rocky shoal, with a depth of 2 fathoms over it, lies about 2 cables to the north-eastward of the north end of Congreso, and nearly in mid-channel.

Submarine telegraph cable.—There is a telegraph cable to Melilla and Nemours. The cable is landed near the south point of Isla de Isabel Segunda.

Anchorage. — Zafarin islands afford the only anchorage on the coast of Marocco which is adapted for vessels of all classes; the best position is about 2 cables southward of Isla de Isabel Segunda, in from

General charts 2437, 2717, 1, 2158a, 449.

Plan of Zafarin islands on 1692. Var. 12° 50′ W.

6 to 9 fathoms water, over muddy sand and good holding ground. Care must be taken not to anchor near the telegraph cable. The channel between the islands and Cabo del Agua is deep and clear of danger. In approaching the anchorage either from east or west the best route is south of the islands, giving them a short berth.

As this group is situated in the bight formed by Cabo Tres-Forcas and Fegalo, the gales are not generally felt so much as in the offing, and it is therefore considered a fair anchorage. With strong on-shore winds a sea sets in between Islas Congreso and Isabel Segunda, notwithstanding the rocky shoal at the entrance; but the causeway serves as a breakwater with north-easterly winds.

Directions.—Zafarin islands are easily distinguished either from the east or west, as they lie well off the land, but from the northward they are blended with the high land of the coast (*see* view on plan), in approaching them Congreso will be first seen. Sailing vessels bound to these islands, with north-easterly winds, should endeavour to make the land well to windward of them, so as to prevent having to beat up against a strong westerly current. With westerly winds, Cabo Tres-Forcas should be sighted, and the group steered for, being watchful in anchoring for squalls and eddies, which in strong breezes blow over Isla Congreso.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

Wadi Maluya. — From Cabo del Agua a sandy beach, named Tazagraret, trends in an east-south-easterly direction for 11 miles to the mouth of the Wadi Skiss; behind the beach is the large plain of the same name, which is thickly populated, and the land gradually rises to the mountains in the interior. The beach is clean, and has depths of from 5 to 6 fathoms at a mile, and 11 fathoms at 2 miles from the shore. The Wadi Maluya (Ancient Flumen Malva or Malucha), after a course of about 400 miles, enters the sea 4 miles eastward of Cabo del Agua; it is the largest river on the coast, and is sometimes in very heavy flood.

Boundary (*Lat. 35° 5′ N., Long. 2° 13′ W.*). — The **Wadi Skiss or Ajerud,** the eastern boundary of the Riff coast, also separates Marocco from the French territory of Algeria. The stream is small in summer, but much swollen in winter.

Burj Saida.—On the left bank of Wadi Skiss, and close to its mouth, is situated the village of Burj Saida; it has a small garrison of Sherifian troops.

The Kasba de Saïda, an old rectangular establishment situated on the left bank of the river, and about 500 yards from the beach, is conspicuous from seaward.

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Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 40′ W.

ALGERIA extends eastward from the Wadi Skiss, with a coast-line of 710 miles to Cap Roux, has several deep bays, and a generally bold coast, off which, at short distances, are a few small islands.

Tides.—The tides on this coast are unimportant. The water is higher with westerly winds and lower with easterly winds. Should the water be high in calm weather it is a sign of a coming westerly wind. It is generally higher in winter than in summer, when westerly winds are prevalent, but the rise and fall of the water seldom exceeds a foot.

Port Say.—This town, the most westerly French settlement in Algeria lies about half a mile eastward of Wadi Skiss. The most conspicuous objects are the Zouaves camp, comprising many houses with red roofs; the villa Say surmounted by a cupola; the hotel; a very white minaret on a small steep promontory; and a French fort, known as La Sentinelle, on a hill behind the town. The population in 1910 was about 300. Port Say is a free port, and a small trade with the interior is carried on.

Port. — The port is formed by two small piers; the eastern runs out about 338° true for about 100 yards, and the western one 0° true for about 175 yards, but there is only water enough alongside for small boats.

Anchorage. — The road is very exposed to all winds from the westward, through north to north-eastward, but in fine weather there is good anchorage about 6 cables from the port in 6 fathoms, sand and mud, with Cap Milonia bearing 79° true; the Minaret bearing 165° true and Cabo del Agua bearing 286° true.

Supplies.—No supplies of any description can be obtained.

Rocket station.—There is a rocket apparatus at Port Say.

Cap Milonia (*Lat. 35° 6′ N., Long. 2° 8′ W.*), moderately high, and projecting slightly, is the north extreme of Mont Dakla, 692 feet high, with a conspicuous lookout house on its summit, and surrounded by low land, which gives it the appearance of an island when seen from eastward or westward. Some islets lie off it, and on its western slope a stream runs into the bay.

Ras Fugal, a mountain 4,658 feet high, situated about 17 miles south-south-westward, and Sidi Burkrirat 2,047 feet, about 7 miles south-south-eastward of the cape, not only indicate its position, especially from the eastward, but that of the Zafarin islands.

Rock.—A rock, with 9 feet water over it, reported to lie 1½ cables north of Cap Milonia, was unsuccessfully searched for during the last French survey.

Coast. — Ras Bu Madane is situated 2 miles eastward of Cap Milonia, and has a cove with good landing on its west side, and

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 40′ W.

another affording good anchorage for small vessels on its east; and between this and Ras Kela, a distance of 4½ miles, is a bay with several streams running into it.

At one mile westward of Ras Kela, and 2 cables from the shore, there is a rocky flat with depths of from 2 to 13 feet over it. Nemours lighthouse, well open of Ras Kela, bearing 84° true, clears these rocks.

Between Ras Kela and Nemours the coast is elevated and rocky, with some small bays, frequented by small vessels loading with esparto grass, in the fine season; off a point midway between Ras Kela and Nemours, rocks extend nearly 2 cables from the shore.

Plan of Nemours on 178.

BAIE DE NEMOURS (or Jemma Gazuat) (*Lat. 35°6′ N., Long. 1° 53′ W.*), 8 miles eastward of Ras Kela, has a clear sandy beach, is about three-quarters of a mile wide, and 1½ cables deep, and affords anchorage with off-shore winds in from 9 to 12 fathoms water. Coasting vessels resort to this anchorage for wheat and other produce of the country, and to land supplies at the pier for the military station of Nemours; but directly the wind sets in from the north-east quarter, vessels should run for the Zafarin islands, which are distant 27 miles.

Two rocks, named Les Fréres, are situated 1½ cables northward of the west point of the bay; they are steep-to, having 3½ fathoms water alongside, and the highest is 79 feet above the sea. Two small rocks named Les Sœurs lie inside them.

Landmarks.—The hill on which is situated Touent (Jemma Gazuat), where there are the ruins of an old Arab town, with a ruined lighthouse and blockhouse, rises with precipitous sides close north-eastward of the town to a height of 423 feet, and immediately behind the town is a hill 302 feet high. The slaughter-house, situated westward of the town, and half-way up the coast cliff, is a conspicuous object, also the church in the town, which has a steeple. Tajera (Pan de Noé), an isolated, round mountain, with a flat summit, 9 miles eastward of Nemours, and 2,825 feet above the sea, is the best mark for recognising Nemours; Filhausen, 10 miles south-eastward of Nemours, and 3,734 feet above the sea, is visible in clear weather from a distance of 60 miles.

Nemours, bearing 90° true, distant 2 miles.

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Plan of Nemours on 178. Var. 12° 40′ W.

Harbour works.—An artificial harbour is in course of construction, formed by a breakwater which will extend for a distance of 1,300 feet in a westerly direction from the north point of the bay, and another, which will extend from the western end of the town for 570 feet in a north-westerly direction, and for a further distance of 1,000 feet in a northerly direction, enclosing a space which will be eventually dredged to a least depth of 23 feet and protected by a detached breakwater, 1,200 feet long in an east and west direction.

In 1912 the northern breakwater had been completed for a distance of 600 feet and the first portion of the southern breakwater. A jetty, 300 feet long, at right angles to the northern breakwater, had also been completed.

LIGHT (*Lat. 35°6′N., Long. 1°53′W.*).—On the point forming the west side of the bay, from a cylindrical tower, 38 feet in height, surmounting a dwelling, is exhibited, at an elevation of 307 feet above the sea, a *white group flashing* light, showing *three* flashes *every fifteen seconds*, thus:—flash, *one second;* eclipse, *two and a half seconds;* flash, *one second;* eclipse, *two and a half seconds;* flash, *one second;* eclipse, *seven seconds.* It is visible from a distance of 22 miles in clear weather.

Anchorage.—The best anchorage is north-eastward of Les Fréres, in depths of from 10 to 12 fathoms water, over fine sand, with good holding ground.

Town.—The town of Nemours had, in 1910, a population of about 4,500; it runs parallel to the beach for about a third of a mile, but landing is frequently impossible during the winter months.

Communication.—There is a fortnightly steamer to Marseille, calling at some of the Algerian ports.

Telegraph.—A submarine telegraph cable is laid between Nemours and Zafarin islands.

Jetties.—A small landing jetty is situated north of the town, and one near the Custom-house.

Life-saving station.—A rocket apparatus is stationed at Nemours.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

Cap Tarça, lying 17 miles eastward from Cap Milonia, is 371 feet high, and lower than the land in its vicinity, and projects seaward, and it may be known by its cliffs, which are of a yellow colour. On the east side of the cape there is a rocky bay named Erkene. At a moderate distance from the westward, in fine weather, a house or marabut appearing like a fort will be seen on a rocky elevation, nearly isolated and steep, about 2½ miles to the south-westward of the cape; near this height is the town of Tarara.

Ras Lella-Selti, 1¼ miles south-eastward of Cap Tarça, has a

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Chart 2437, Cape Tres-Forcás to Cape Ivi. Var. 12° 40′ W.

white marabut tower on it, and shelters a bay with a sandy beach from westerly winds; the Wadi Bunna flows into the sea through the beach, and on its left bank there is another white marabut tower.

Anchorage. — North-eastward of the beach rocks extend 2 or 3 cables from the coast, but off the entrance to the river there is a depth of 3½ fathoms about a cable distant, and it is a good anchorage, for a small vessel, during the fine season.

Cap Noé (*Lat. 35° 11′ N., Long. 1° 41′ W.*), 6 miles to the eastward of Cap Tarça, is rounded, salient, and with cliffs attaining a height of 345 feet. There are two remarkable ravines, situated 2½ miles and one mile south-westward of the cape; the first-named, Marsa Arobat, is the mouth of the Wadi Bab el Atra; the second, a sinuous cleft, extends some distance, is more than 300 feet in height, and at its foot water spouts out by digging in the sand.

Tajera, already described, is situated 3 miles southward of the cape, and about 4 miles eastward of it, another mountain, named Sfian, somewhat remarkable, with level top and a gentle slope, is 2,811 feet high.

Cap Noé, bearing 110° true. *Tajera.* *Cap Tarça.*

In Mersa Honain, on the east side of Cap Noé, there is a cove, open to the north-westward, with a beach, to which small vessels resort for the purpose of grounding, and near the beach are lines of walls, and the ruins of a town, which formerly must have been of some extent. There are depths of from 20 to 25 feet at 1½ cables from the shore.

Water may be procured from the Wadi El Msabé, which runs into Mersa Honain, and is abundant even in summer, and about 1½ miles north-eastward of this a jet of excellent fresh water issues from a hole in the cliff at an elevation of about 10 feet, but the cliff is steep, and boats could only approach it in very fine weather and with smooth water.

Coast. — From Mersa Honain the coast trends to the north-eastward for 11 miles, and is irregular, high, and steep as far as Mersa Trémezen. Jezirat El Mokreun, 3½ miles north-eastward of Cap Noé, forms two pointed rocks, shaped like asses' ears, and 131 feet high: it is separated from the mainland by a channel 1¼ cables in width, in which there are some rocks, but small vessels use it, and also anchor south-westward of the islet. South-eastward of the islet there is a ruined tower on the coast 394 feet above the sea.

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Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 40′ W.

Ras Lubar Dama, 2½ miles north-eastward of El Mokreun, is 407 feet high, and may be recognised by three islets which lie at its foot; there are bays on either side of this point in which small vessels anchor.

Ras El Karush, or Sidi Yacoub, 2½ miles north-eastward of Ras Lubar Dama, is surrounded at its foot by rocks awash, and a detached rocky flat with 9 feet water over it extends one cable north-westward of the point; a hill, named Bu Keltun, 1,200 feet high, 1½ miles eastward of the point, and surmounted by a watch-tower, is conspicuous. Jebel Sidi Yacoub, 990 feet high, lies one mile southward of the point.

Ile Ronde, 92 feet above the sea, lies 2½ cables from the point, with a depth of 6½ fathoms between it and the mainland.

At 2 miles eastward of Ras El Karush there is a small bay, named Sidi Madani, perfectly sheltered from easterly winds; it is bordered by red and yellow cliffs, and there is a white marabut tower on a hill to the southward of it.

Plan of Rashgun island, &c., on 178.

Ile Rashgun, 20 miles to the eastward of Cap Tarça, is rather more than half a mile long in a northerly and southerly direction, about 220 feet high, with a flat and bare summit, and bold and steep-to, with islets and rocks close to the south-eastern end, and a rocky bank extends half a cable from its eastern side.

Ile Rashgun, bearing 270° true, distant 3 miles.

It is separated from the mainland by a channel 8 cables wide, with from 3¼ to 13 fathoms water, over sandy bottom, and small vessels, using this channel, should keep near the island.

LIGHT (*Lat. 35° 20′ N., Long. 1° 29′ W.*).—On the north point of the island, a square tower, 50 feet in height and surmounting a dwelling, exhibits, at an elevation of 267 feet above the sea, an *alternating flashing red* and *white* light *every ten seconds*, showing alternate *red and white flashes;* the flashes being *four seconds* followed by a total eclipse of *six seconds;* it is visible in clear weather from a distance of 22 miles.

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Plan of Rashgun island and entrance of Tafna river on 178. Var. 12° 14′ W.

Landing.—The landing place, on the south point, is sheltered by off-lying rocks.

Anchorage.—Coasting vessels find sheltered anchorage under the lee of the island, with winds from the north-eastward on its south-western side, and with those from the north-west and west on its south-eastern and eastern sides, distant 1½ cables, in depths of from 14 to 17 fathoms; the bottom is sand and mud, but there are several rocky patches, and it is advisable to ascertain the nature of the bottom before anchoring. It should be observed, however, that if the wind from these quarters freshens much, the anchorage should be abandoned, as the island is small, and affords but little shelter from the sea.

Wadi Tafna.—To the southward of the island the coast forms Mersa Trémezen, which is small, and terminated on the west by Ras Boccus and Île Siga, and on the east by Cap Acra. At the head of the bay the Wadi Tafna runs through the middle of a sandy beach; it has a course of about 20 miles, about one foot water on the bar, and from 5 to 8 feet inside. A sandbank, formed by the deposit of the river, extends a distance of 4½ cables off the mouth and is cleared by keeping the south point of Île Siga in line with Bu Keltun watch-tower bearing 224° true.

Île Siga (*Lat. 35° 18′ N., Long. 1° 28′ W.*), 62 feet above the sea, is black and rocky, and undermined by the sea, and lies 2 cables from Ras Boccus; in the narrow passage between it and the rocks, which are uncovered, extending from Ras Boccus, there are 2 fathoms water.

Coast.—About 2 cables eastward of Wadi Tafna is Pointe Maure, with a ruined tower and fortifications on it: 1½ cables north-westward of the point there is a depth of 13 feet, and on its south side is a cove with a landing place, where vessels unable to cross the bar seek shelter during easterly winds. On the north side of the cove is a rocky shoal, awash, apparently the remains of an old mole.

Landing may be effected to the southward of this rocky shoal.

Plan of Beni Saf harbour on 178.

PORT BENI SAF.—Between the entrance of Wadi Tafna and Cap Ussa (or Gros), the coast, for a distance of 8 miles, is rich in iron ore, and about 4½ miles eastward of Wadi Tafna is the port of Beni Saf, which consists of an artificial harbour about 45 acres in extent, belonging to a private company, formed by two breakwaters, and having depths of 23 to 27 feet.

General charts 2437, 2717, 1, 2158a, 449.

Plan of Beni Saf harbour on 178. Var. 12° 40′ W.

The western breakwater extends from the shore in a northerly direction for 526 yards, and then turns to the eastward for a distance of 492 yards; the eastern breakwater is a short arm, 330 yards long, parallel to the first portion of the western, and the entrance between the breakwaters, open to the east, is 174 yards wide. The western pier is reserved for the company's exclusive use; the other is open to general shipping.

Vessels can go alongside the western breakwater, and there are two wharves at the eastern breakwater, one of which will accommodate a small vessel. There is a movable crane on the east breakwater.

The population of Beni Saf is about 5,300, consisting of French, Spaniards and Moors.

Light (*Lat. 35° 19′ N., Long. 1° 24′ W.*). — At the extremity of the northern breakwater a *fixed green* light is exhibited from a wooden gibbet, at an elevation of 39 feet above the sea; in clear weather it is visible from a distance of 3 miles, but, in bad weather, it is not exhibited.

Directions. — During fresh north-easterly winds, sailing vessels should keep the northern breakwater on board to prevent being set upon the southern breakwater. A large vessel should anchor in the northern part of the harbour and moor stern to the breakwater with hawsers, which are provided at a fixed charge; the bottom is fine sand, and the holding ground good. There is room for about 12 vessels inside the breakwater, which can load to 20 feet, the cargoes being put into them by a shoot on the breakwater.

Communication.—Steamship communication fortnightly with Marseille and Nemours; telegraphic communication with all parts.

Coal and supplies.—About 500 tons of coal are kept in stock, and vessels can coal alongside a wharf where there is a depth of 25 feet; north-westerly winds prevent or impede coaling. Supplies of fresh provisions are plentiful and reasonable in price, also water, which may be obtained from a reservoir on the western breakwater.

Repairs.—General repairs can be effected at the company's workshops.

Pilots.—Pilotage is free, but there are fixed charges for entering the port and for mooring, 25 francs and 10 francs, respectively. Two pilots belonging to the company bring vessels in, and large vessels are recommended to take a pilot.

Life-saving station.—A rocket apparatus is maintained here.

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Plan of Beni Saf harbour on 178. Var. 12° 40′ W.

Trade.—Large shipments of iron ore are made from this port; calamite or zinc ore, marble and onyx are also exported.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

Coast.—Cap Ussa or Gros lies 4 miles north-eastward of Beni Saf, and between the coast is clean: the cape is conical shaped, with a rounded summit, Jebel Awaria, 902 feet above the sea, and is a good day mark; several rocks extend about half a cable from the cape. About 1¾ miles north-east of Beni Saf there is a remarkable rock close to the shore, named Île aux Pigeons.

Jebel Awaria. *Cap Ussa or Gros, bearing 220° true, distant 4 miles.*

At Camerata, 2 miles eastward of Cap Ussa, there are iron mines, now unworked; and 3 cables eastward of a small point, midway between the cape and the bay, there is a rocky flat with about 10 feet water over it.

From Camerata the coast is formed of vertical cliffs from 230 to 330 feet above the sea, and composed of agglutinated sand from decomposed sandstone. The Rio Salado, Wadi Mela (ancient Flumen Salsum), the most important stream on this part of the coast, runs into the sea, 6 miles north-north-eastward of Camerata; south of the mouth of the river, in a small bay, there is a village named Helb el Abiod, where esparto grass is grown, and at 3 miles north-north-eastward is the mouth of the Wadi Sessel with another small village. Southward of the Rio Salado three conical mountains are conspicuous from seaward, viz., Sidi Kassem, 1,174 feet (*see* view on chart); Dar Mengel, 984 feet; and Dar Tuila, 1,013 feet high; there are three or four small islets near the coast about 3½ miles north-north-east of Wadi Sessel.

Anchorage.—Vessels anchor off the Rio Salado with easterly winds at the distance of a mile, in 15 or 16 fathoms water, over fine sand: but the anchorage should be quitted the moment there is the least indication of an on-shore wind.

Cap Fegalo (*Lat. 35° 35′ N., Long. 1° 12′ W.*), 15 miles north-north-eastward of Cap Ussa, is a large rounded point, 597 feet above the sea, easily recognised from all directions, and surmounted by a watch-tower which may be seen from a considerable distance. A

General charts 2717, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 40′ W.

small islet, almost steep-to and pointed in form, is situated 3 cables westward of the cape, and there is a sufficient depth of water for vessels to pass between it and the mainland: there are also some sugar-loaf shaped rocks quite close to the foot of the cape.

Cap Fegalo, bearing 10° true, distant 14 miles.

Semaphore. — There is a semaphore station on the cape. Call letters A.K.Z.G.

Anchorages.—Cap Fegalo projects nearly a mile, and north and south of it anchorage may be obtained according to the wind at the time. With East and N.E. winds the anchorage south of the cape is good, in from 5½ to 6½ fathoms water, about 5 cables south of the west point of the cape, and 3 cables from the shore; small vessels may go closer in. With winds between South and W.S.W., small vessels find good anchorage eastward of the cape in a bay named Marsa Mta-Buzujar, and in the eastern part of this bay there is a small creek completely sheltered from winds between north and east.

Water. — The Wadi el Farsh runs into this creek, and sometimes fresh water may be obtained, but the stream is frequently dry.

Coast. — Between Cap Fegalo (*Lat. 35° 35′ N., Long. 1° 12′ W.*) and Cap Blanc, a distance of 11 miles, a chain of mountains, from 1,000 to 1,300 feet high, borders the coast, falling to the sea in inaccessible cliffs. The most remarkable summits are Mezaita, 1,312 feet; Tuila, 1,223 feet; M'Garat, 1,109 feet; and Ksebis, 1,276 feet high (*see* view A on chart); the cliffs are steep-to, there being a depth of 11 fathoms, within half a cable of the shore, but on that part of the coast, in the vicinity of the two latter mountains, there are some islets and rocks extending 2 cables from the shore.

At 7½ miles north-east of Cap Fegalo, there is a conical mountain, named Jebel Allai-Kadra, 623 feet high, and rising abruptly from the edge of the sea, with a small bay on each side of it; in Marsa Ali Ben Nuar, the western, there are some abandoned iron and copper workings.

An islet, 112 feet above the sea, rounded and steep, is situated 2½ miles north-north-eastward of Marsa Ali Ben Nuar, with a channel between it and the mainland more than 2 cables in width, and with depths of from 8 to 11 fathoms. One mile south-westward of the islet, and 2 cables from the coast there is a rocky flat, with about 6 feet water over, and depths of from 5 to 6 fathoms around it.

General charts 2717, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 40′ W.

Cap Blanc or Sigale, 11 miles north-eastward of Cabo Fegalo, is rounded, from 650 to 950 feet above the sea, and remarkable from a white cliff terminating it; rocks covered and uncovered border the cape, extending to a distance of 2 cables.

Water.—Westward of the cape, and situated near a garden, there is a spring yielding abundance of water.

Plan of Habibas islands on 178.

Îles Habibas or Avivas (*see* view A on chart 2437), situated 5½ miles north-westward of Cap Blanc are two islands, the south-western being the larger; they are surrounded by isolated rocks, and form a group 2 miles in extent in a north-west and south-west direction. The larger and western island is 344 feet above the sea, at its southern end, about 6 cables in length, and with an extreme breadth of about 3½ cables; the positions of numerous rocks and shoals surrounding the island will be best seen by referring to the chart.

In the channel between the island and the mainland there are depths of from 45 to 50 fathoms, over gravel, and between the islands the channel is almost filled by two cliffy islets and several rocks, there is however a passage on the south side in which a depth of 10 feet is reported and it is stated that the depth varies according to the prevailing wind.

LIGHT (*Lat. 35° 43′ N., Long. 1° 8′ W.*).—On the summit of the western island a square masonry tower, 38 feet in height and surmounting a rectangular shaped building, exhibits, at an elevation of 366 feet above the sea, a *white flashing* light *every five seconds*, thus: —flash, *seven-tenths of a second;* eclipse, *four and three-tenths seconds*, which is visible in clear weather from a distance of 25 miles.

Anchorage. — The best anchorage for a large vessel is in from 14 to 16 fathoms water, over sand, with the lighthouse bearing 277° true, and the west summit of the northern islet 15° true, taking care to avoid a shoal, with 2½ fathoms water over it, which lies bearing 77° true, distant 5 cables from the lighthouse.

Small vessels may anchor nearer the land in 8 to 10 fathoms, sand, in front of the small bay to the north-eastward of the lighthouse.

In rounding the south end of the group care should be taken to avoid the rocks which extend nearly a mile in a south-west direction.

Landing may be effected at the head of the small bay, north-eastward of the lighthouse, where there is a mass of brick-work, with a depth of 1½ feet at its foot.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

Mejillones rocks (Les Moules), 1½ miles northward of Cap Blanc, are two rocks nearly united, low and black, 20 and 23 feet above

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 30′ W.

the sea, and covered with a kind of cockle. Except on the north-west side, where a depth of 20 feet extends a short distance, they are steep-to, having 11 fathoms water alongside.

Between these rocks and the coast there are depths of from 15 to 17 fathoms, over a bottom of sand and gravel.

An isolated rock having a depth of 3¾ fathoms lies 1½ cables to the north-eastward of Mejillones; and another rock, having a depth of 6½ fathoms, lies half a mile eastward of the same group.

Jebel Tuila. Cap Blanc. Cap Fegalo. Mejillones rocks, bearing 225° true, distant 4 miles.

Current. — Near Mejillones rocks the current sometimes runs parallel to the coast at the rate of 2 knots.

Cap Lindless (Jaumel) (*Lat. 35° 44′ N., Long. 0° 56′ W.*), 5 miles north-east of Cap Blanc, is 967 feet high, and formed in two sides by a rocky cliff (*see* view A on chart); to the southward of the cape are two mountains, Sidi Abdalla, 1,302 feet, and Ain Fares, 1,270 feet high. Some rocks lie at the foot of the cape, the outermost being 1½ cables distant from it in northerly directions; there is a depth of 9 fathoms about 6 cables from the cape.

Baie Andaluses, comprised between Cap Lindless and Pointe Corales, 6 miles to the eastward, is about 2 miles deep, and on the south shore of the bay Andaluses farm and the custom house are visible from seaward, also on an elevated plain the villages of El Argor and Bu Sefer. At 3 miles southward of the bay is the summit of Ain Benisaabia, 1,958 feet high, on which is an observatory.

Anchorage. — There is good anchorage in the bay, with winds from East, round by South, to West, with sandy bottom, in the western part.

Île Plane, surrounded by a cluster of rocks, lies north-eastward distant 3 miles from Cap Lindless; it is 1⅓ cables in length, in an easterly and westerly direction, half a cable in breadth and 59 feet above the sea, with an irregular summit, which from a distance appears level. The rocks around it are more numerous on its western side, but they are steep. There is a cove on the eastern and another on the south-western side, in which small vessels may find shelter. The two channels which it forms with Cap Lindless and Cap Falcon are clear of dangers, with depths of from 35 to 45 fathoms, over sand and gravel.

General charts 2717, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 30′ W.

Light. — From a white cylindrical tower, 21 feet high, on Île Plane, is exhibited an unwatched *fixed red* light, elevated 77 feet above the sea, and visible from a distance of 4 miles.

Vesta rock, with 11 feet water over it, does not break with a moderate sea, and is situated half a mile northward, and a rock, with about 6 feet water over it, lies 2 cables to the westward from Île Plane. There is a rocky shoal, with a depth of 8 fathoms over it, 1½ miles westward of the island. The whole of the Montagne des Lions well open of Cap Falcon, bearing 100° true, leads to the northward of the rock.

Cap Falcon, 8 miles eastward of Cap Lindless, is the eastern extreme of a broad headland, the western part of which, named Pointe Corales, is lower and more rocky than the eastern part, and has a hill over it, which at a distance appears like an island.

Pointe Corales is low, and to the southward of it small vessels find anchorage, sheltered from easterly winds; one mile south-westward from the point there is a rocky flat, with 3 feet water over it, which is distant a quarter of a mile from the shore. Rocks also extend 1¾ cables to the northward, and 1½ cables to the westward of the point.

The headland between Pointe Corales and Cap Falcon presents a front to the north nearly 2 miles in length, with a slight bend and a small beach, and between the point and the cape are some small islets and rocks near the shore, and a large islet, also near the shore, lies 2½ miles north-eastward of the lighthouse; along the headland at the distance of half a mile there are depths of from 18 to 25 fathoms. (*See* also views on chart.)

Cap Falcon lighthouse, bearing 270° true, distant 9 miles.

LIGHT (*Lat. 35° 46′ N., Long. 0° 48′ W.*).—On the summit of Cap Falcon, a white octagonal stone tower, 86 feet in height, exhibits, at an elevation of 347 feet above the sea, a *white group flashing* light, showing groups of *four* flashes *every twenty-five seconds*, thus:—flash, *four-tenths of a second;* eclipse, *two and seven-tenths of a second;* flash, *four-tenths of a second;* eclipse; *two and seven-tenths of a second;* flash, *four-tenths of a second;* eclipse, *two and seven-tenths of a second;* flash, *four-tenths of a second;* eclipse, *fifteen and three-tenths of a second.* It is visible in clear weather from a distance of 26 miles.

General charts 2717, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 30′ W.

Signal station. — Semaphore. — There is a semaphore and signal station, connected by telegraph with all parts, which can be communicated with by the International code of signals. Call letters A.K.Z.E.

Life-saving station. — A station, to render assistance in the event of shipwreck, is maintained on the coast south of Pointe Corales.

Coast. — The coast from Cap Falcon is clear for 4 miles, in the middle of which and about one-third of a mile inland is the village of Ain Turk, and a steeple in the middle of plain, covered with villages and farms, which extend to the Oran mountains; the summits of Uled Bakir, 1,798 feet, and Rigada, 1,784 feet high, may be seen from seaward.

Bank.—A small bank, with 9 fathoms, rock, over it, lies 2½ miles north-eastward of Ain Turk village, it is surrounded by depths of from 30 to 40 fathoms.

Life-saving station. — A station, to render assistance in the event of shipwreck, is maintained at Ain Turk.

Baie Aguadas (*Lat. 35° 45′ N., Long. 0° 47′ W.*), on the east side of Cap Falcon, has a clear sandy beach, and affords shelter from south-westerly and westerly winds in from 4½ to 6½ fathoms water, 2½ to 3 cables from the commencement of the shore.

Landing is easily effected in the middle of the rocks in front of the commencement of the beach.

Water. — A cistern of masonry is situated near the beach; it is however generally dry in summer.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave Port d'Oran are **earnestly requested** to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:—

On the south, east, and west, by the coast between Pointe Corales and Needle rock.

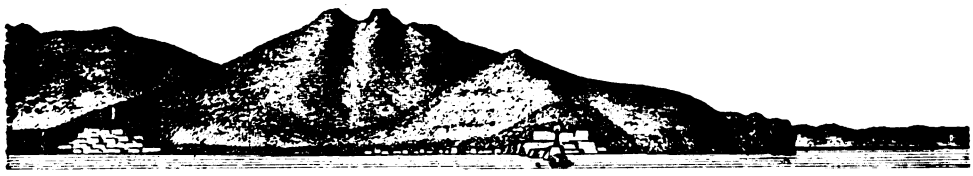
On the north, by the alignment (248° true) of Pointe Corales and Cap Lindless, until the grove, situated southward of Télégraphe (Aluja) farm, bears 125° true; thence by the last-named line until meeting the line joining Mars el-Kébir lighthouse and Pointe Canastel; thence by this last-named line until Oran new cathedral bears 205° true; thence by a line drawn in a 25° true direction until meeting the alignment (76° true) of Cap Ferrat and Needle rock; thence by this alignment to Needle rock.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

General charts 2717, 1766, 1, 2158a, 449.

Plan 812, Oran harbour and Mars el-Kébir bay.

MARS el-KÉBIR and PORT D'ORAN. — At 2 miles south-east of Ain Turk the coast becomes high and rocky for about 1½ miles to North point, with inaccessible cliffs, 229 feet high, and backed by Jebel Santon, 1,050 feet high; Ras Mars el-Kébir, on which is the lighthouse, is low, and projects for a distance of 4½ cables, and is almost entirely covered by a fort.



St. André. *Jebel Santon.* *Ras Mars el-Kébir lighthouse.*

From Ras Mars el-Kébir the shore trends westward and southward, forming the Mars el-Kébir (ancient Portus Divinus) the best natural anchorage on the whole coast of Algeria, being about three-quarters of a mile deep.

To the southward of the point, in the bay, is the post office and coal stores, and two-thirds of a mile further south the small village of Saint André; an earthwork battery, about 8 cables west-north-westward of village of Ste. Clotilde, is conspicuous.

Monte Ramera, which rises over the south-west shore of the bay, is remarkable; at about 2 miles south-south-eastward of Ras Mars el-Kébir is the castle or fort of Santa Cruz, standing on a hill and commanded on the west by Mount Meseta (Jebel Murdjadjo), 1,404 feet high, and having a north-east and south-west direction. Between this mountain and the fort the land forms a break, the more remarkable at a distance from the coast. Another fort named San Gregorio is farther eastward on a hillock over Mona point (Pointe Lamoune), on which there is Fort Lamoune.

Half a mile eastward of Ste. Clotilde are the Queen's baths (Bains de la Reine), where there are celebrated thermal springs. A chapel, which is conspicuous from the westward, lies between Forts Santa Cruz and San Gregorio, 971 feet above the sea. Close westward of Fort Lamoune the coast forms two small creeks; in the western one are sea baths, and the eastern has a remarkable grotto; here, also, there are regular depths of 4 fathoms within 50 yards of the land.

Jetty. — A jetty, commencing on the eastern side of the small camber near the south-west angle of Fort Mars el-Kébir, extends in a south-westerly direction for about 600 feet.

LIGHTS (*Lat. 35° 44′ N., Long. 0° 42′ W.*). — In Fort Mars el-Kébir is a white octagonal tower, 69 feet in height, which exhibits,

General charts 2437, 2717, 1766, 1, 2158a, 449.

Plan 812, Oran harbour and Mars el-Kébir bay. Var. 12° 30′ W.

at an elevation of 121 feet above the sea, a *fixed white* light, which, in clear weather, is visible from a distance of 9 miles.

An unwatched *fixed green* light is exhibited from an iron column, 19 feet in height, on the outer end of the jetty; it is visible in clear weather from a distance of 3 miles.

A *fixed* light, showing *red* seaward and *white* towards the land, is shown, at an elevation of 16 feet above the sea, from the west angle of the mole.

A *fixed* light, showing *green* seaward and *white* towards the land, is exhibited, at an elevation of 13 feet above the sea, from the quay at Village de Sainte André, but neither of these last two lights are shown about the period of full moon.

Mooring buoys. — A mooring buoy, in 10 fathoms water, is situated 3 cables, 230° true, from Mars el-Kébir lighthouse, and another one about 1½ cables southward of the mole lighthouse.

Pilots may be procured from Oran, and vessels must call off that port to obtain them.

Anchorage (*Lat. 35° 44′ N., Long. 0° 42′ W.*).—Mars el-Kébir is suitable for vessels of any size, the depth being from 8 to 17 fathoms, and the bottom muddy, with sand and weeds. Small vessels, to have complete shelter, should anchor well in, with a hawser to the shore at the foot of the fort.

Directions. — Sailing vessels, approaching the bay with fresh north-easterly winds, are often becalmed, and obliged to anchor off Ras Mars el-Kébir; and although winds from this quarter do not reach the anchorage, they send in a considerable sea and swell. Vessels with a fresh breeze from westward should round Ras Mars el-Kébir as closely as is prudent (being prepared for the eddy winds and squalls), and stand as far in as is convenient.

Coal and supplies.—About 7,000 tons of patent fuel, the property of the French Government, is kept in stock, and a private firm also imports a considerable quantity, but there are no lighters. There is neither provisions nor water here, but small quantities may be obtained at Oran, about 2½ miles distant, between which and Mars el-Kébir there is a military road.

Winds.—The south-west wind, named Polvorista, blows with great force out of the valleys in the high mountains (about 1,760 feet) which surround the bay, when it is necessary to be ready with another anchor.

In the bay the high land is the cause of great irregularity in the winds, both as to direction and force, during fine weather; while in the offing the steady wind prevails.

General charts 2457, 2717, 1766, 1, 2158a, 449.

Plan 812, Oran harbour and Mars el-Kébir bay. Var. 12° 30′ W.

PORT D'ORAN (*Lat. 35° 43′ N., Long. 0° 39′ W.*).—The artificial harbour of Oran is formed by an outer breakwater, and two short piers at right angles to it. The outer breakwater, named Jetée du Large, extends for a distance of 800 yards eastward from Mona point (Pointe Lamoune), and is further prolonged east-north-eastward for a distance of about 250 yards to the lighthouse.

Works are in progress for prolonging this arm for a further distance of 1,400 yards; about 800 yards had been quite completed in July, 1912, and the remainder, all except the last 70 yards, was partially completed. A short transversal jetty is being constructed near the outer end of Jetée du Large, and a jetty is being constructed extending about 450 yards north-north-westward from Cap Blanc; the inner end is marked by a beacon and the outer by a light-buoy.

Jetée Sainte Thérèse, on the south side of the entrance, has a northerly direction for about 200 yards, and is 150 feet broad.

A jetty, Quai des Hauts-fonds, is in course of construction extending from Fort Sainte Thérèse north-eastward along the shoal for a distance of about 500 yards. The outer end for a distance of about 150 yards was above water in July, 1912.

At the point of prolongation of the Jetée du Large, a short pier, about 60 yards in length, extends to the southward, towards Jetée Sainte Thérèse, leaving an entrance about 120 yards in width between the pier heads, the area enclosed being about 60 acres.

In the south-west corner of the harbour is Vieux Port, formed by quays from the western and southern shores, and having an area of 10 acres; on the south side of the basin is the Custom-house and arsenal.

The repairing dock and torpedo station are in the south-eastern corner of the harbour. The health office is at the eastern end of Jetée Duguay Trouin.

Avant-port is comprised between Jetée du Large on the north, Quai des Hauts-fonds on the west, and the jetty from Cap Blanc, when completed, on the east.

Westerly winds raise the level of the water in the port; easterly winds lower it, the difference between the two levels amounts to about 2 feet.

Depths.—The depths in the northern portion of the harbour are from 5¼ to 6½ fathoms, and in the southern there is a minimum of 4¼ fathoms, over sandy bottom. In Vieux Port there is 3¼ to 3¾ fathoms. The Quai de la Gare, on the south side of the harbour, has depths of 29 feet alongside. In l'Avant-port there is from 3 to 8 fathoms.

General charts 2437, 2717, 1766, 1, 2158a, 449.

Plan 812, Oran harbour and Mars el-Kébir bay. Var. 12° 30′ W.

LIGHTS (*Lat. 35° 43′ N., Long. 0° 39′ W.*).—About the centre of Jetée du Large is exhibited, at an elevation of 45 feet above the sea, from a white iron turret, 29 feet in height, on a stone base, a *white group occulting* light, showing groups of *three* occultations every *eighteen seconds*, thus:—light, *nine and three-quarter seconds;* eclipse, *three-quarters of a second;* light, *three seconds;* eclipse, *three-quarters of a second;* light, *three seconds;* eclipse, *three-quarters of a second:* it is visible in clear weather from a distance of 12 miles.

A *fixed red* light is exhibited, at an elevation of 20 feet above the sea, from a white wooden building, 16 feet in height, and situated on the N.E. corner of Jetée Sainte Thérèse; it is visible from a distance of 4 miles.

An unwatched *fixed green* light is shown, at an elevation of 21 feet above the sea, from an iron column 14 feet in height, on the spur extending southward from Jetée du Large, and forming the northern side of the entrance; it is visible from a distance of 3 miles. For arc of visibility, *see* Light list.

From the extremity at each angle of Jetée Duguay Trouin, or centre quay, on the north side of Vieux Port, a *fixed red* light is shown, and, in clear weather, is visible from a distance of 4 miles.

Light-buoys.—A red light-buoy, exhibiting a *fixed green* light, marks the outer end of the works for extension of Jetée du Large, and a similar buoy, exhibiting a similar light, marks the outer end of a transversal jetty, constructing from the south side of Jetée du Large extension. Vessels must not pass westward of these buoys, and they must be left on the starboard hand entering.

A black light-buoy, exhibiting a *fixed red* light, is moored at the northern end of the mole under construction, extending from Cap Blanc; it lies 322° true, distant $2\frac{6}{10}$ cables from Cap Blanc battery.

Vessels entering the harbour must pass between this buoy and the previous one mentioned.

A black light-buoy, exhibiting a *fixed red* light, marks the outer end of the works in progress on Quai des Hauts-fonds. Vessels must not pass southward of this buoy.

Mooring buoys.—Two mooring buoys, for the use of large vessels, lie in L'Avant-port.

Shoal.—In the bay, between Fort Sainte Thérèse and Cap Blanc, l'Avant-port, shoal water extends generally for a quarter of a mile from the beach.

Pilots.—Pilots board vessels a short distance off the port; the pilot station is on the Jetée Sainte Thérèse, and in bad weather, if unable to come out, a red flag is hoisted on a mast at Mona point.

General charts 2437, 2717, 1766, 1, 2158a, 449.

Plan 812, Oran harbour and Mars el-Kébir bay. Var. 12° 30′ W.

Anchorage.—Vessels should not anchor off the harbour, as the holding ground is bad; in the outer harbour they are moored with two anchors, and a stern warp to the mole. A vessel anchoring in l'Avant-port should drop her anchor in about 8 fathoms of water, and moor with her stern to one of the mooring buoys, the most easterly one for preference. There is only room for two large vessels in l'Avant-port, and no protection from the eastward until the jetty from Cap Blanc is completed, so large vessels are recommended to anchor in Mars el-Kébir.

Directions.—Running in from seaward steer for the east of the town, and when the mole is seen proceed to the eastward of the outer light-buoy marking the extension works, and there await a pilot. The steeple of the chapel of Santa Cruz, about two-thirds the way up the hill from its base, forms an excellent mark for vessels approaching from the westward.

At night. — Arriving off the harbour at night, a vessel will be safe, with Cap Falcon light well open of Mars el-Kébir light, bearing about 303° true, and the harbour lights bearing about 180° true. Should the light of the outer light-buoy be extinguished by bad weather the *red* light on the buoy north-eastward of Fort Sainte Thérèse must not be brought to bear more than 225° true.

Town (*Lat. 35° 43′ N., Long. 0° 39′ W.*). — The town of Oran, second in importance to Algiers, stands at the foot of the mount and fort of Santa Cruz, and has a population estimated in 1910 at 115,000. Taken by the Spaniards in 1505, it was abandoned after its destruction by an earthquake in 1792. In 1830 it was occupied by the French, and is now the capital of the department of the same name. It is divided into two parts, the old, and the modern town eastward and southward of it, which are separated by a ravine and a rivulet, and joined near the beach by a tunnel; the modern town is growing very rapidly. A British vice-consul is resident at the port.

Communication.—There are about three steamers every week to Marseille and the Algerian ports, and every fortnight or three weeks to Gibraltar, Malaga, Fiume, and the Marocco ports. Railway communication with Algiers, by the Oran-Algiers railway and the West Algerian railway runs from Oran to Ain Temouchent, a distance of 48 miles. *See* also Communication, page 18. There is an excellent service of electric tramways both in the town and to the suburbs.

Telegraphic communication with all parts; the telegraph office is always open.

Submarine telegraph. — A submarine cable connects Oran and Marseille.

General charts 2437, 2717, 1766, 1, 2158a, 449.

Plan 812, Oran harbour and Mars el-Kébir bay. Var. 12° 30′ W.

Coal and supplies. — About 17,000 tons of coal are usually kept in stock by private firms; there are about 200 lighters, 30 of which are used for coaling, and from 20 to 30 kept loaded. Coaling is carried on by baskets or tubs; 2,000 tons could be put on board in 24 hours. There is a coal wharf 700 feet long, with depths of 20 to 30 feet alongside. Nine tugs are available.

All necessaries can be procured, and the water is fairly good and plentiful. There is a hose at the north-east end of Jetée Duguay Trouin; also water boats.

Patent slip.—Small floating dock.—There is a patent slip and a small floating dock for torpedo boats. For particulars, *see* Appendix I.

Repairs.—There are facilities for ordinary repairs to machinery.

Hospitals. — Seamen are admitted to the civil and military hospitals.

Life-saving station. — There is a lifeboat maintained in the port, and a life-saving station at the Custom-house.

Weather signals.—The state of the weather at Algiers is telegraphed every day at 5 in the evening and communicated to vessels by the Port authorities.

Trade. — The principal exports are cereals, wine and alcohol, esparto grass, minerals, cigars, cigarettes, and fresh fruit; and imports French manufactured goods, agricultural machinery, petroleum, beer, chemical manures, coals, and patent fuel; 382,355 tons of coal and patent fuel were imported in 1910 to Oran and Mars el-Kébir.

Shipping. — In 1910, 3,609 vessels, with a total tonnage of 3,176,814 tons entered the port.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

Montagne des Lions or St. Augustin (Jebel Kahar), 2,104 feet high, and 8½ miles eastward of Oran, is isolated and remarkable; from the westward it presents a large base and flat summit, sloping to the southward; from the northward its summit also seems level; but from the eastward and beyond Cap Ferrat it appears conical. It is arid and rocky, as well as the adjoining land, and with the break in the land between Mount Meseta and Monte Santa Cruz are good distant marks for Oran. See views A and B on chart.

Pointe Canastel (Ras Jazar) (*Lat.35°47′N., Long.0°33′W.*), the eastern extreme of Port d'Oran, and the termination of a spur from Montagne des Lions, projects westward, is a large yellow cliff, steep, and inaccessible, and on its extremity is a small isolated, conical-shaped hill, 480 feet high, which makes it remarkable; some rocks above and below water lie nearly half a cable from the point. The

General charts 2717, 1766, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 30′ W.

coast between the town of Oran and the point is rocky, increasing gradually in height towards the latter; in the plain midway, there are numerous houses and the small village of Arcole, with its steeple.

Depths off-shore.—This coast is clear of danger, with a depth of 11 fathoms at half a mile from the shore; and between Ras Mars el-Kébir and Pointe Canastel the depths are from 40 to 45 fathoms, the bottom being sand and shells.

Anchorage.—Eastward of Pointe Canastel there is a bay which affords anchorage to small vessels, sheltered from east and west in not less than 4½ fathoms water; nearer the shore there are rocks.

Winds in the gulf. — Between the months of November and March bad weather frequently comes from the west-north-westward, commencing from the south-westward with a low barometer, the land misty, and the sky full of black clouds, travelling rapidly; a swell from the westward generally precedes the winds, and in autumn, principally, these winds are accompanied by rain and heavy squalls.

After a day or two the S.W. wind goes to the west, the sky clears, and after from 24 to 48 hours changes to the north, with a rising barometer, and the bad weather is over; but if the wind changes to the south it indicates a second depression, and sometimes blows stronger than on the first occasion. Strong winds from the North and N.E. are rare, perhaps one or two of the latter in winter; the barometer remains high, the sea becomes rough before the wind rises, and the land is covered with thick mist, which interferes with making the land.

Abuja point (Cap de l'Aiguille). — From Pointe Canastel the coast forms a slight bend with a beach, and is still high, forming the cliffs of Krichtel, steep, with a narrow strand at their foot; it trends to the north-eastward for 6½ miles to Abuja point, which is a mass of rocky cliffs somewhat similar to Cap Ferrat, and terminates in a peak, 814 feet high; it falls rapidly from high broken ground 1,972 feet high. Rocks awash extend three-quarters of a cable north-eastward of the point.

To the southward of the point the coast forms a slight bend, which affords shelter for small vessels from easterly winds. With strong breezes, heavy squalls blow down from the ravines.

LIGHT (*Lat. 35° 53′ N., Long. 0° 28′ W.*). — From a *white* cylindrical masonry tower, 36 feet high, with a dwelling attached, on this point, is exhibited a *white group flashing* light showing groups of *two* flashes *every ten seconds*, thus:—Flash, *seven-tenths of a second;* eclipse, *two and five-tenths seconds;* flash, *seven-tenths of a second;*

General charts 2717, 1766, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 30′ W.

eclipse, *six and five-tenths seconds.* It is elevated 203 feet above the sea, and is visible in clear weather from a distance of 20 miles.

Signal station.—Semaphore.—A signal station and semaphore connected by telegraph with all parts, is situated at Jebel Krichtel, 1,978 feet above the sea and about 2 miles south-east of Abuja point; it may be communicated with by means of the International code of signals; but owing to its great height, it is frequently enveloped in clouds, making exchange of signals difficult, if not impossible. Call letters A.K.Y.G. About 1½ miles eastward of Jebel Krichtel is Jebel Orusse, 2,076 feet high.

Needle rock (Rocher l'Aiguille), Seba-Faraon (Pharaoh's finger) of the Arabs, about 1¼ miles north-eastward of Abuja point and 1¼ cables from the shore, is an islet 157 feet above the sea, in the form of a sharp-pointed sugar-loaf, and at times has the appearance of a vessel under sail. A rock with 6 fathoms water over it lies 8¾ cables north-north-eastward from the Needle rock.

Jebel Orousse. *Jebel Krichtel.* *Needle rock, bearing 225° true, distant 10 miles.*

Cap Ferrat (Ras al Mishat) (*Lat. 35° 56′ N., Long. 0° 22′ W.*), 5½ miles eastward of Abuja point, is 725 feet above the sea, rocky, and broken, with rocks on its western side. The coast between the point and the cape forms a bend, and is composed of rugged cliffs which have a sombre appearance. (*See* view on chart.) Half a cable north of the cape there is a rocky flat with 9 feet water over it. A rock, with about one foot water over it, lies about 1½ cables, north-eastward of Cap Ferrat, and another rock, with a depth of 9 feet, is situated between the preceding and the west point of the cape.

Coast. — Between Cap Ferrat and Cap Carbon, a distance of 2¼ miles, the coast is bordered by rocks above water and awash extending 3 cables from the coast. Cap Falcon lighthouse seen between the Needle rock and the mainland, bearing 247° true, leads to the northward of these dangers.

Cap Carbon is equally rocky; it is 489 feet above the sea, has a rounded appearance, and in certain positions, and especially from a distance north-west, it seems isolated. A rock, with 2¾ fathoms water over it, is situated 1½ cables north-eastward of the cape, and there are several rocks southward of the cape, but they are close to the land.

General charts 2717, 1766, 1, 2158a, 449.

Plan of Arzeu on 1766. Var. 12° 30′ W.

Îlot d'Arzeu.—Three miles from Cap Carbon, and 2 cables from the coast is a group of islets, the highest and southernmost being Îlot d'Arzeu; the coast between is rugged and rocky. Rocks, with 2 to 3 feet of water over them, extend 1¼ cables north-eastward of the islet, and should be avoided when standing in for the anchorage at Arzeu; the south side of the islet is steep-to.

LIGHT (*Lat. 35° 53′ N., Long. 0° 18′ W.*).—On Îlot d'Arzeu a circular turret, 41 feet in height and surmounting the centre of a white dwelling, exhibits, at an elevation of 66 feet above the sea, a *flashing red* light *every five seconds*, thus:—light, *seven-tenths of a second;* eclipse, *four and three-tenths seconds;* it is visible in clear weather from a distance of 13 miles.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave Port d'Arzeu are **earnestly requested** to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:—

By the arc of a circle drawn with Îlot d'Arzeu lighthouse as centre, with a radius of 2 miles, meeting the coast northward and southward of the lighthouse.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

Tunny fishery.—Tunny nets are generally laid out during the season, 1st April to 1st November, southward of Îlot d'Arzeu, the extremities being about 4 cables from the land.

The nets are marked by day with flags or beacons, and by night with *white* lights exhibited from pontoons or rafts. *See* also Caution, page 73.

Shoal.—A rocky shoal, 60 yards in diameter, on which the depths are irregular and with 2¼ fathoms water over its centre, is situated about 2½ cables from the shore and 6 cables south from Îlot d'Arzeu lighthouse; the shoal is steep-to on its seaward side, there being 7½ fathoms close outside it.

RADE D'ARZEU.—At a mile southward of Îlot d'Arzeu is Pointe Arzeu, the eastern extreme of Rade d'Arzeu; the fortification on the point commands the anchorage, and there is a military post on the beach. Rade d'Arzeu recedes more than 7 cables to the westward, and affords convenient shelter from that quarter, with good holding ground. The beach is rather shallow, there being only 9 feet water at the distance of a cable, and hence difficult to approach

General charts 2437, 2717, 1766, 1, 2158a, 449.

Plan of Arzeu on 1766. Var. 12° 30′ W.

when there is any sea from the north-eastward; it is a well-known resort for sea bathing.

Port.—Piers.—The outer pier, named Jetée Abri, Jetée Est, or Jetée Exterieure, extends in an east-south-easterly direction for 306 yards from Pointe Arzeu, and the inner pier, named Jetée Ouest, Grand Quai, or Jetée Interieure, from a position about a cable to the westward, has a southerly direction for 240 yards; the distance, between pier heads, is 460 yards, and the triangular space between has depths of 4¼ fathoms in its outer part. The inner pier is to be extended for a distance of about 330 yards.

Jetée Débarcadère, to which the railway runs, is situated 3½ cables westward of the inner pier, and is about 100 yards long.

Two long moles, perpendicular to the coast, are being built between Jetée Ouest and Jetée Débarcadère.

Lights (*Lat. 35° 52′ N., Long. 0° 18′ W.*).—A *fixed green* light is shown, at an elevation of 25 feet above the sea, from an iron standard 16 feet in height, situated on the head of Jetée Est; it is visible in clear weather from a distance of 3 miles, but, during N.E. gales, it cannot be lighted.

On the head of Jetée Ouest a *fixed green* light is exhibited, at an elevation of 25 feet above the sea; it is visible in clear weather from a distance of 3 miles. For arc of visibility, *see* Light list and plan.

A *fixed red* light is shown from an iron standard at the extremity of Jetée Débarcadère.

Buoys.—Two warping buoys are moored about one cable westward of the Jetée Ouest.

Pilots can be obtained, and pilotage is compulsory for all vessels entering and leaving. The rate of pilotage is, for sailing vessels 0·16 fr., for steam vessels 0·08 fr. per ton of registered tonnage.

Anchorage.—There is anchorage in 6½ fathoms water, 6½ cables eastward of the church, which is situated in the middle of the town, or a better anchorage in 4 fathoms water at 4½ cables eastward of the church; vessels intending to remain any time usually moor with the anchors north-west and south-east. The bottom is sand and weed and good holding ground, but there are some rocks and the nature of the bottom should be ascertained before anchoring.

Directions.—A sailing vessel from the westward anchoring at Arzeu, with strong winds from that quarter, should be prepared for the heavy squalls from the high land. Care should be taken to avoid the rocks off Îlot d'Arzeu and the rocky shoal, a third of a mile, north-eastward of the outer pier head. The distant marks for the bay are Montagne des Lions, before mentioned, and the large headland projecting northward between Abuja and Arzeu points.

General charts 2437, 2717, 1766, 1, 2158a, 449.

Plan of Arzeu on 1766. Var. 12° 30′ W.

Town. — The town of Arzeu, containing 6,500 inhabitants in 1910, extends along the shore of the bay, and about 3½ miles south-eastward of the town are the ruins of Arzeu Viejo, with Roman remains and large cisterns.

Communication.—There are steamers every fortnight to Marseille and Mostaghanem; the railway joins the Algiers and Oran line at Perregaux; there is a light railway to Oran, and a steam tramway leads to the salines or saltpans of Arzeu; an excellent road connects Arzeu and Oran. Telegraphic communication with all parts. *See* also page 18.

Coal. — Supplies. — No coal or patent fuel is kept in stock. Supplies are not plentiful, but they may be obtained if notice is given. Good water may be obtained on the quay.

Hospital.—There is a mixed hospital.

Life-saving station.—A life-saving gun is maintained at the Custom-house.

Trade. — The principal exports are alimentary flours; wine and brandy; esparto grass, sheep and cattle; and imports, coal, wood, metal articles, minerals, oils, building materials, and provisions.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

GOLFE D'ARZEU. — Between Cap Carbon and Cap Ivi, a distance of 29 miles, lies Golfe d'Arzeu, semicircular in form and 11 miles deep; the whole of the shore of the gulf is a succession of beach and cliff, increasing in height to Cap Ivi.

Port aux Poules is situated 8 miles eastward of Arzeu (*see* view C on chart), and here, close to some cliffs, the Wadi Habra or Magta runs into the sea; it is partly navigable for vessels of light draught, but there are only about 3 feet water on the bar. The railway runs close to the shore for a distance of 10 miles from Arzeu, and close to Port aux Poules.

Dangers.—A rock with less than 6 feet over it lies about 3 cables from the shore, about one mile westward of the coastguards' station at Port aux Poules. A rocky shoal, about three-quarters of a cable in extent, with 9 feet water over it, lies about half a mile north-east of the coastguards' station at Port aux Poules, and another rocky shoal, with a similar depth over it, is situated 1$\frac{2}{10}$ miles northward from Magta telegraph.

Life-saving station. — A station, to afford assistance in the event of shipwreck, is maintained at Port aux Poules.

Pointe de la Salamandre or Mazagran (*Lat. 35° 55′ N., Long. 0° 3′ E.*), 13 miles north-eastward of Port aux Poules, is low, and projects with a reef having a depth of 1¾ fathoms over it extending nearly half a mile north-westward from it. A *white* sector from

General charts 1766, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 30′ W.

Mostaghanem Jetée Sud light shows over the point. The village of La Stidia lies a little way inland behind a sandy beach midway between Port aux Poules and Pointe Mazagran.

The village of Mazagran stands south-eastward of the point, about a mile inland, and possesses a large military hospital, there is also a conspicuous monument and a steeple 480 feet above the sea; about 1¼ miles south-westward of the village is Jebel Mazagran, 656 feet high, on which is a telegraph.

Plan of Mostaghanem on 1766.

PORT DE MOSTAGHANEM (*Lat. 35°56′N., Long. 0°5′E.*) (ancient Murustaga).—Pointe de la Salamandre is the south-western extreme of the bay forming the Port de Mostaghanem; Ras Mostaghanem (Karuba), which is higher and rocky, is surmounted by a ruined chapel, and forms the north-eastern extreme; the two points being 3 miles apart.

The town, founded in the 16th century, and the most important in Golfe d'Arzeu, stands on level land 2 miles eastward of Pointe de la Salamandre, about half a mile from the sea; the Wadi Ain-Sefra divides the town into two quarters, that of the Europeans being to the west and that of the Arabs to the east, and had a population of 22,000 in 1910, of whom about one-third were Europeans; the office of the captain of the port, and other buildings, are on the beach.

Mostaghanem will be recognised by the two white marabut towers on high land to the eastward (not so high as the town), the village and fort of Mazagran, and the light-tower. The chief trade is in cattle and grain.

Pointe de la Salamandre. *Mostaghanem, bearing 45° true, distant 5 miles.*

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port de Mostaghanem are **earnestly requested** to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:—

By the arc of a circle drawn with the Jetée Nord lighthouse as centre, with a radius of 2 miles, meeting the coast northward and southward of the port.

General charts 1766, 1, 2158a, 449.

Plan of Mostaghanem on 1766. Var. 12° 20′ W.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

Harbour.—The harbour consists of an outer breakwater, Jetée Nord, extending, from the north side of the town, in a westerly direction for about 450 yards, and further prolonged in a south-westerly direction for about 540 yards; at about a cable from the commencement of the breakwater a short arm extends to the southward, and at about the same distance from the breakwater end a similar arm has a south-easterly direction.

About 3½ cables south-westward of the root of the breakwater a pier, Jetée Sud, about 360 yards in length, extends perpendicular to the coast, the entrance, about 100 yards wide, being between its extremity and that of the western of the two arms already mentioned.

Dredging is in progress, and it is intended to dredge the harbour to a minimum depth of 16 feet, but at present only the outer part of the harbour is available for large vessels, and with strong westerly winds a heavy sea sets in.

LIGHTS (*Lat. 35° 56′ N., Long. 0° 5′ E.*).—On a plateau, westward of the marine barracks, is a square stone turret, 30 feet in height and surmounting a dwelling; it exhibits at an elevation of 115 feet above the sea, a *fixed red* light, which in clear weather is visible from a distance of 6 miles. This light is to be extinguished in the course of year 1913.

On the outer extremity of Jetée Nord is exhibited, at an elevation of 30 feet above the sea, a *fixed white* light, visible in clear weather from a distance of 6 miles. This light is to be replaced in the course of 1913 by an unwatched *group occulting, three groups, white* and *red* light, *every fifteen* to *twenty seconds.*

On the outer arm of Jetée Nord, a *fixed red* light is shown from a crane 13 feet in height, at an elevation of 16 feet above the sea; it is visible in clear weather from a distance of 3 miles. In the course of year 1913 a new unwatched *fixed red* light is to be exhibited from a round metal tower, and will be visible from a distance of 4 miles.

On the end of Jetée Sud a *fixed green* light with a *white* sector is exhibited, at an elevation of 16 feet above the sea, from a crane 11 feet in height, and is visible in clear weather from a distance of 3 miles. The light shows *green* seaward and in the harbour, and *white* over Pointe de la Salamandre. This light is to be replaced, in course of year 1913, by an unwatched *fixed green* light, which will be exhibited from a round metal tower.

Caution.—Bad weather may prevent the breakwater lights from being exhibited, in which case vessels should not attempt to enter the harbour.

Buoy.—A black buoy marks shoal water extending about a quarter

Plan of Mostaghanem on 1766. Var. 12° 20′ W.

of a cable from Jetée Nord, and should be left on the port hand when entering.

Pilots.—There are no pilots at Mostaghanem. When vessels make the demand the harbour master or his assistant will go on board.

Mooring buoys.—There are three mooring buoys at the head of port.

Anchorage. — Large vessels anchor, with off-shore winds, in about 14 fathoms water, about 6 cables westward of the extreme of Jetée Nord; merchant vessels secure alongside the jetty, the bottom being sand covered with clay. Vessels anchored outside the port should leave directly the signal, indicating the approach of bad weather, is hoisted.

Directions.—Vessels approaching Mostaghanem from the westward should keep in the *green* sector of the light on the Jetée Sud, and entering the harbour, pass between the *red* and *green* lights.

Communication.—There is a steamer every fortnight to Marseille and Arzeu; the railway connects, at Relizane, with the Algiers and Oran line; telegraphic communication with all parts. *See* also page 18.

Mostaghanem is connected by good roads with the Dahra, the valley of the Mina, Hillil, and the lower course of the Shelif.

Storm signals. — Signals indicating the probable approach of bad weather are made, but not regularly, from a mast at the port office, situated north-eastward of the lighthouse, and consist of a red flag hoisted at the masthead by day, and at night a *white* and a *red* lantern light at each yard arm.

Life-saving station.—A life-saving gun is maintained at the Port office, and a rocket apparatus at the Custom-house.

Coal.—Supplies.—About 4,000 tons of coal and patent fuel is usually kept in stock; there are 5 lighters available.

Provisions are plentiful, there is no water tank, but there are two water pipes with a weak delivery on Jetée Sud.

Chart 2437, Cape Tres-Forcas to Cape Ivi.

COAST. — From Ras Mostaghanem the coast is high and steep, trends to the north-eastward for 4½ miles to Wadi Shelif (*Lat. 36° 2′ N., Long. 0° 8′ E.*), and is backed by mountains from 1,150 to 1,200 feet high, but at the foot of these, the alluvium of the river has formed a low point which should be given a good berth at night or in thick weather.

Wadi Shelif, the largest in Algeria, has very little water over the bar, especially in summer, and an entrance obstructed by a bank of sand, brought down by the freshes. This bank was reported (1904) to

General charts 1766, 1, 2158a, 449.

Chart 2437, Cape Tres-Forcas to Cape Ivi. Var. 12° 20′ W.

have extended for a distance of about half a mile, therefore this part of the coast should not be approached too closely.

The river will be known by the ravine through which it runs, and by a conical hill situated on its left bank, and about a mile inland, which shows out in the middle of the ravine, when seen from the eastward. There is a metal bridge across the river about half a mile from the mouth.

Wadi Shelif (ravine).

Jebel Chaibia, 2 miles north-eastward of the river, is a remarkable conical hill 678 feet high, and forms a good mark. *See* view D on chart.

Jebel Mazagran telegraph open of Ras Mostaghanem, bearing 194° true, leads to the westward of the shoal water off the mouth of the river.

Coast. — The beach of alluvium of sand and mud from the Wadi Shelif terminates one mile north-eastward of the mouth, after which cliff and strand alternate for 4 miles to Kef el Eurcher, off which several rocks extend, in a north-westerly direction, for nearly 4 cables; half a mile north-eastward of the points several rocks also lie off the coast.

Chart 1969, Cape Ivi to Algiers.

Cap Ivi, 6½ miles north-eastward of Wadi Shelif, is of moderate height, but little salient, and difficult to distinguish on account of the high land from which it projects. *See* view on chart 2437. About 1½ miles eastward from the cape is Jebel Korima, 971 feet high, and having a white look-out on its summit.

LIGHT (*Lat. 36° 7′ N., Long. 0° 13′ E.*).—On the middle of the declivity of the cape, 650 yards from the sea, is an octagonal stone tower, 61 feet in height, in the centre of a white house, from which, at an elevation of 389 feet above the sea, is exhibited a *flashing white* light *every five seconds*, showing a *flash* for *half a second*, *eclipse* for *four and a half seconds;* it is visible in clear weather from a distance of 26 miles.

Port de Bosquet.—From Cap Ivi the coast trends in a north-easterly direction for 4 miles to a rocky point, 56 feet high, and nearly mid-way there is another rocky point 101 feet high. The former point shelters Port de Bosquet, a small fishing village, where there is a landing jetty of masonry, with about 6 feet water at its extremity, but only accessible to boats in smooth water.

General charts 1766, 1, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 12° 10′ W.

Kef el Assfer, a level, rocky point of no great elevation, lies 7 miles north-eastward of Cap Ivi; at night or in thick weather, it is dangerous of approach, being difficult to distinguish from the high land backing it. On the west side of the point is Teddert bay, which recedes to the south-east, affording shelter from easterly winds; it is recognised at a distance by the sandhills which surround it, and which appear as white patches; the Wadi el Abid runs into the bay about a mile south of the cape.

Pointe d'el Aua, low and rocky, is 2½ miles eastward of Kef el Assfer, and eastward of the point is Porticioli village where there is a pier; from Pointe d'el Aua a bank of sand runs eastward parallel to the coast for a mile, and is distant from it 1½ cables; between is a channel with from 3 to 8 feet of water suitable for small craft. The currents in this locality are sometimes very strong.

Coast. — At 11 miles north-eastward of Porticioli, Wadi Caddur marabut, 390 feet above the sea, stands on the summit of a conical hill, about 1½ cables from the coast, and 1½ miles farther, in the same direction, is Kef Jibliler, a low, cliffy point. The Wadi Khamis enters the sea 1½ miles further on, through a deep valley, and here are large yellow sandhills which are not commonly seen on this coast: on the northern slope of this valley Ashasha marabut, 279 feet above the sea, stands a little underneath the crest of the hill.

Cap Khamis (*Lat. 36° 20′ N., Long. 0° 40′ E.*), situated 24 miles eastward of Cap Ivi, is low and projecting, and terminates in a red cliff, conspicuous when the sun shines on it; two patches, with 16 and 19 feet water over them, lie off-shore about a mile eastward of Cap Khamis, and a patch with 16 feet about 3 cables westward of the cape with foul ground extending 1½ cables north-eastward of it.

All this part of the coast is composed of cliffs and beaches, and about midway between the two capes there is a large dark triangular patch, very distinct when seen from the westward.

Coast.—From Cap Khamis the coast, forming a slight bend southward, trends eastward for a distance of 8 miles to Cap Magrowa, the whole being a sandy beach backed by downs. Cap Magrowa is a projection from a rounded mountain, 1,280 feet high, which is the north-eastern extreme of high land running parallel to the coast, and a little east of it begins a beach which, surrounding the bay of the same name, terminates near Islote Colombi.

Jebel Bellcuffa. *Cap Magrowa, bearing 80° true, distant 1½ miles.*

General charts 1766, 1, 2158a, 449.

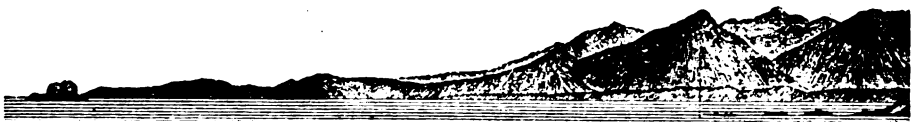
Chart 1909, Cape Ivi to Algiers. Var. 12° 10′ W.

Several black rocks lie along the beach, affording a little shelter to the country boats that resort here for honey, wax, and other produce. Within the bay, and at a mile from the shore, there are from 32 to 37 fathoms water, over mud bottom.

The summits of Srim, 2,553 feet, of Tasheta, 2,582 feet, and of Alluda, 2,694 feet high, are all useful in recognising this part of the coast, especially the latter, which in clear weather may be seen from a distance of 50 miles; Jebel Slib, 1,549 feet high, in the form of a cone, is a mile from the coast south-westward of Cap Magrowa.

Islote Colombi (*Lat. 36° 26′ N., Long. 0° 55′ E.*), a rock, deriving its name from the number of pigeons found there, is 92 feet high, and in the passage between it and the shore, which is about 3 cables wide, there are 4½ to 5½ fathoms water. It is bold all round, and coasters frequently seek shelter under its lee by securing with an anchor seaward and a hawser to the shore.

Between Cap Magrowa and this is a strand 7 miles in length, through which several rivers run into the sea. Jebel Bellcuffa (Bel Kufa) 951 feet above the sea, and a mile south-eastward of Islote Colombi, has a look-out house on its summit.



Islote Colombi, bearing 55° true, distant 8 miles. *Jebel Bellcuffa.* *Cap Magrowa.*

Coast.—Leaving Islote Colombi, the coast eastward becomes arid, rocky, and high, with cliffs intersected by sandy beaches, which continue as far as Rade de Tenez. It presents some salient points, such as Ras Kala, the extreme of a spur of Jebel Gutul, 1,152 feet high; it has an islet 20 feet above the sea on its western side, about 2 cables from the coast, and is generally bold and backed by high mountainous land, Jebel Bu Meçaud, with a conspicuous summit, being 2 miles inland and 2,454 feet high; 6 miles eastward of this there is a very conspicuous marabut on Jebel Es Sadj. Between Ras Kala and Tenez the coast is rocky and bordered by several rocks, some extending for 2 cables from the coast.

Cap Tenez (*see* view on chart) is a mass of steep, rocky land, 2 miles in extent, east and west; its cliffs are nearly vertical and from 600 to 900 feet high. Immediately above it rises Sidi Meruane, which attains an elevation of 2,093 feet, and on which there is a white look-out. From the eastward or westward the land appears almost isolated, caused by the bays on each side of it. To the south-

Chart 1909, Cape Ivi to Algiers. Var. 12° 10′ W.

ward of, and beyond Sidi Meruane are two peaks named Pitones, and more to the south-eastward the peak of Taznunt, 2,579 feet high.

Plan 3301, Tenez road and harbour.

LIGHT (*Lat. 36° 33′ N., Long. 1° 20′ E.*). — About one cable eastward of the western extreme of Cap Tenez is a grey square tower, 85 feet in height, with a main building, which exhibits, at an elevation of 292 feet above the sea, a *group flashing white* light, showing groups of *two* flashes *every ten seconds*, thus:—flash, *half a second;* eclipse, *two seconds;* flash, *half a second;* eclipse, *seven seconds;* it is visible in clear weather from a distance of 24 miles.

Signal station.—Semaphore.—There is a semaphore on Cap Tenez, with which vessels can communicate; letters A K Y T, of the International code, are the distinctive signal.

Dangers.—There are several rocky ledges extending from the foot of this headland; that named Ecueil de l' Etna, on which a vessel of this name was lost, lies north-westward from the lighthouse and about three-quarters of a cable from the cliffs; there are others off the middle of the headland, rather more than a cable distant; and Ecueil du Phoque, with 6 feet water on it, half a cable eastward of the east extreme of the headland. At a distance of half a mile from the headland there are 55 fathoms water, and, in passing, it should have a berth of at least three cables.

Rade de Tenez is exposed from the north-east round by north to north-west, affording shelter only from easterly winds. In summer it may be frequented without any great risk, but in winter it should be resorted to with caution, and quitted the moment there is any sign of a change from an easterly wind. The anchorage is with the town lighthouse bearing between 158° true and 180° true, distant 4 to 5 cables, in depths of from 7½ to 8½ fathoms, over muddy sand, and good holding ground.

Vessels staying for any time should moor with two anchors, as the changing of the land and sea breezes is liable to foul a single anchor.

With westerly winds vessels may find shelter in Baie de Taragnia, east of Cap Tenez.

PORT DE TENEZ.—The harbour, situated three-quarters of a mile eastward of the town, consists of two moles, protected by a detached breakwater 440 yards in length in an easterly and westerly direction.

The western mole first extends to Ilot du Port, a distance of about

Plan 3301, Tenez road and harbour. Var. 12° 10′ W.

2¾ cables, and is known as the Jetée Sud-Ouest, then turns at nearly right angles to the eastward, and is named the Jetée Nord-Ouest.

The eastern mole, known as the Jetée Nord-Est, is 448 yards in length, but nearly 200 yards of the outer portion is only an enrockment a little above the level of the sea; the mole heads are about 180 yards apart.

The space enclosed is about 62 acres. The bottom is muddy sand and holding ground good; the western entrance, between the detached breakwater and the Jetée Nord-Ouest, is 220 yards in width; the eastern, between the breakwater and Jetée Nord-Est, is 130 yards in width.

The western part of the detached breakwater is not completed, and is under water for a distance of 110 yards, and some blocks of stone lie inside the breakwater; the east extreme is marked by a large stake.

There is a small jetty in the south-east angle, and one in the south-west angle, of the port.

Vessels in the harbour moor with an anchor astern; the squalls from the mountains are sometimes very heavy, with westerly winds.

Depths. — The depth in the western entrance is from 8½ to 9½ fathoms; in the eastern entrance 6½ fathoms; in the harbour from 3¼ to 5½ fathoms in the outer part, and from one to 2¾ fathoms nearer the shore.

Lights (*Lat. 36° 31′ N., Long. 1° 19′ E.*). — The followng lights are shown: —

A *fixed white* light, elevated 48 feet above the sea, from an iron support 21 feet in height, erected at the root of the Jetée Nord-Ouest, extending from Ilot du Port.

A *fixed white* light, with a *green* sector over the eastern entrance, elevated 24 feet above the sea, and shown from an iron support, 15 feet in height, erected at the head of the same jetty, about one cable 50° true from the previous light.

The *fixed white* light at the root of the jetty, in line with the *green* sector of the light at its extremity, bearing 230° true, leads through the eastern channel.

A *fixed white* light, with a *red* sector over the west channel, elevated 24 feet above the sea, and shown from an iron support, 15 feet in height, erected on the head of Jetée Nord-Est.

Bad weather may prevent the three preceding lights from being lighted.

General charts 1909, 1766, 1, 2158a, 449.

Plan 3301, Tenez road and harbour. Var. 12° 10′ W.

A *fixed white* light, with a *red* sector over the west channel, elevated 52 feet above the sea and shown from an iron support, 16 feet in height, on the cliffs, about 2 cables north-eastward from Pointe Aiguade.

The *red* sectors of the above two preceding lights in line, bearing 87° true, lead through the western channel.

Buoys.—A black buoy is moored off the west extreme of the submerged portion of the breakwater; it should be left on the port hand entering, and not approached too closely.

A can buoy, moored about 150 yards north-westward of the small mole on the south-east angle of the port, is used for warping purposes, but the moorings are not sufficiently strong for a vessel to lie at.

Directions.—The extreme safe length for a vessel entering the harbour is 250 feet, and in bad weather the entrance is very dangerous; the western entrance is preferable, but it is always prudent to take a pilot.

By night.—The *red* lights in line, bearing 87° true, lead through the western channel, and the *white* and *green* lights in line, 230° true, through the eastern channel and to the entrance between the jetty heads.

Town (*Lat. 36° 31′ N., Long. 1° 19′ E.*).—The town, containing about 5,200 inhabitants in 1910, stands on level ground about 165 feet high, near the beach, and is a good mark for the roadstead. It is surrounded by walls, and the high white minaret of a mosque is conspicuous. The Wadi Allala runs through the beach eastward of the town; the sandbank in front of it extends 1½ cables from the shore, with about 14 feet water on it. It is proposed to construct a railway to Orléansville.

Supplies. — The town offers few resources, but water, of good quality, may be obtained from a hydrant on the jetty at the south-east angle of the port.

Trade. — The principal export is iron ore. Tenez is the port of Orléansville.

Life-saving station. — A rocket apparatus is maintained at Tenez.

Winds. — During the season, June, July, and August, the sea breeze from East or N.E. often blows with violence, and especially so if it sets in early, 7 or 8 o'clock. In winter the squalls from the West and N.W. are less dangerous than the squalls from the northward. The later set in suddenly and raise a heavy sea.

General charts 1909, 1766, 1, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 12° W.

Baie de Taragnia, on the east side of Cap Tenez, is about a mile wide and half a mile deep, with a cove and sandy beach in the centre. The Wadi Bu Yacub, a mountain torrent, runs into the bay, and about 300 feet above the sea there is a large isolated house.

The head of the bay is a stony strand bordered with small rocks, the most dangerous being at the mouth of the torrent, where they extend rather more than a cable from the shore.

Anchorage.—Vessels having to leave Rade de Tenez, on account of westerly winds, seek shelter in this bay, but it should be left directly there is a sign of the wind shifting on-shore. There is anchorage in from 4½ to 6½ fathoms water, over sand, about 3 cables from the shore, with the point eastward of Kef Arend bearing 326° true, and Ras Suhalia and Kef el Hauaci in line.

Ecueil du Maure (*Lat. 36° 33′ N., Long. 1° 25′ E.*), 1½ miles eastward of Baie de Taragnia, is a flat rock, with a depth of 3 feet over it, situated 3¼ cables from the shore; it has depths of from 10 to 16 fathoms close to, and between it and the shore there are from 6 to 13 fathoms water.

Anchorages. — Marsa Bucherat, 2½ miles eastward of Baie de Taragnia, is well adapted for coasters in summer with south-westerly winds, with anchorage in 4 or 5 fathoms water, over sand; the shore is sandy, the Wadi Bucherat runs into the bay, and on its east side there is a small creek, sheltered from easterly winds.

Marsa Suhalia, farther eastward, and separated from Marsa Bucherat by Jebel Suhalia, conical and 1,007 feet high, is larger; it has good anchorage during summer on its eastern side, but the western side is strewed with rocks. Tames Guida, 3,796 feet high, and the most remarkable mountain on this coast, is situated 5 miles southward of Marsa Suhalia; it is a large pap, and forms a good mark for recognising this part of the coast.

Kef el Hauaci, the eastern point of Marsa Suhalia, and 280 feet above the sea, has rocks off it for a distance of more than a cable.

Ras Abd-el-Kader, the termination of Beni Haua, 899 feet above the sea, and 1½ miles eastward of Kef el Hauaci, is high, rocky, a little salient, and commanded by high land; a point to the westward of this has a natural tunnel in a north-easterly and south-westerly direction.

To the eastward of Ras Abd-el-Kader is Marsa Beni Haua, with a clean beach and anchorage in the eastern part; two rivulets run through the beach.

General charts 1766, 1, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 12° 0′ W.

Port Breira lies in the eastern part of Marsa Beni Haua. It is formed by the small island of Sidi Jilani or Geldi, on which is the iron ore depôt and electric transporter.

Vessels can load at the rate of 500 tons an hour, the transporter being moved out about 100 feet to where the depth is 7½ fathoms.

Buoys. — Two mooring buoys, for the use of vessels, lie in about 9 fathoms and two other buoys in 7 and 6 fathoms, for manœuvring vessels loading. The holding ground of sand and mud is good.

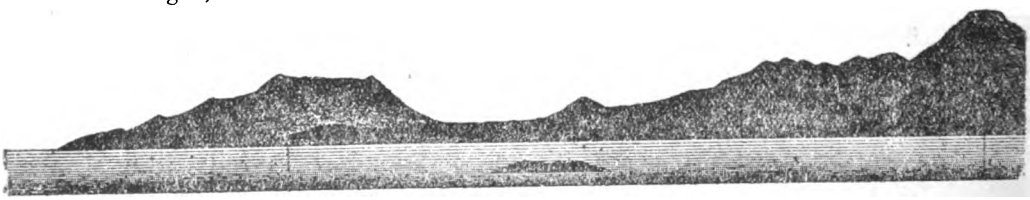
Pilot.—The company's pilot meets vessels 4 or 5 miles outside, in a motor launch.

Caution. — With winds from eastward or north-eastward vessels can generally load, but with those from north to west a dangerous sea sets in, and vessels should be prepared to leave at a moment's notice.

Coast.—From Ras Abd-el-Kader the coast eastward is high, with cliffs intersected with beaches, and backed by elevated mountains, the most noticeable of which is Bu Tuil, 2,047 feet high. At Jelali, 6 miles eastward of Ras Abd-el-Kader, there is a rock about 25 feet above the sea, which forms a small creek, and at about 2 cables to the northward is a dangerous rock, awash, which does not always break. The summit of Beni Haua in line with Taznunt peak bearing 257° true leads to the northward of the rock. The Wadi Damus enters the sea about a mile eastward of the rock, and a village named Dupleix is situated to the eastward of the river.

From the Wadi Damus to Ras Imkardu, 3 miles to the eastward, the coast presents no remarkable features, the village of Villebourg is 3 miles to the eastward of Ras Imkardu, and a rock with 3 feet water over it is situated northward of the village and 2 cables from the shore. The most remarkable mountains in the interior are Tumsikt, 2,756 feet; Jebel Arbel, 3,386 feet; and Guraya, 3,271 feet high.

Jezirat Tokikt Indich (Ashak) (*Lat.36°36′N., Long.1°51′E.*), about 24 miles eastward of the lighthouse on Cap Tenez, and nearly 1½ miles from the coast, is dark, rocky, and only 10 feet high, with 45 fathoms water between it and the shore; it is dangerous to vessels at night, or in thick weather.



General charts 1766, 1, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 12° W.

Ras Taska, a blunt projection of the coast, is 3 miles to the eastward of Jezirat Tokikt Indich, and is quoin-shaped, about 1½ cables in length, half a cable in width, and about 50 feet high; near the coast are some ruins.

Dangers.—The following dangers exist north-westward and westward of Ras Taska:—A rock, about a quarter of a cable in extent, with a depth of 3 fathoms over it, and 6 fathoms around, situated 3¼ cables north-westward of Ras Taska.

A pinnacle rock, with 15 feet water over it, westward, distant 3 cables from Ras Taska.

Ras Taska well open of Ras el Terf, the next point, half a mile eastward of it, leads to the northward of these dangers.

Gouraya, a village which is increasing in importance, is situated south-westward of Ras Taska; it is easily recognised by its white houses.

Pier.—A small pier, prolonged seaward by rocks awash, extends from the shore for a distance of 130 yards, and there is also a landing quay; two rocks about 3 feet above the level of the sea lie half a cable off the point of the village. Northward of the end of the pier and about 2 cables from the coast is a rock with only 8 feet over it.

Life-saving station.—A station, to afford assistance in case of shipwreck, is maintained at Pointe des Mines, northward of Gouraya.

Coast. — Ras Taurira is situated 7 miles eastward of Ras Taska, and between them the coast is generally a shingly beach; the point, slightly projecting, is at the foot of Jebel Taurira, which is conical, fairly regular in form, and 1,837 feet high, and, from its isolation, forms a good mark for this part of the coast. Taurira islet, rounded, 33 feet high, is a cable distant from the coast and connected to it by rocks under water; there is a village near Ras Taurira, named Fontaine du Génie or Grani; it is built on the site of an ancient Roman town.

Pointe des Oliviers, 2 miles eastward of Ras Taurira, projects about 3 cables from the coast; at nearly 2 cables westward of it there is a rock with less than one foot water over it. Novi village, conspicuous from seaward, is a little to the eastward of the point.

Plan of Port Shershel on 1766.

PORT SHERSHEL (Cherchell) (*Lat. 36°37′N., Long. 2°11′E.*), an artificial basin, formed between Îlot Joinville and the shore, is about 290 yards in length, 87 yards in breadth; its entrance, only 24 yards wide, opens to the eastward, but it cannot be entered in bad weather. Vessels drawing 11 feet can moor alongside the Quai du Nord in fine weather only.

General charts 1766, 1, 2158a, 449.

Plan of Port Shershel on 1766. Var. 11° 50′ W.

A rocky bank, with little water over it, extends northward from Pointe des Marabuts, eastward of the port, to Ecueil du Grand Hammam, a distance of about 2 cables eastward of the port; and this bank and Pointe Zizirin, the rocky peninsula, 20 feet high, about half a mile eastward of it, afford some shelter to the entrance to the basin.

A rock awash lies half a cable northward of Pointe Zizirin.

Depths.—The depth in the port is from 10 to 13 feet, except near the Quai de l'Ouest, where the depth is less. In 1906 there was reported to be 2 feet of water less than this in the port.

LIGHTS (*Lat. 36° 37′ N., Long. 2° 11′ E.*).—In the centre of the fort on Îlot Joinville, is a circular stone tower, 79 feet in height, which exhibits, at an elevation of 121 feet above the sea, a *white group occulting* light showing three eclipses *every eighteen seconds*, thus:—light, *nine seconds;* eclipse, *one second;* light, *three seconds;* eclipse, *one second;* light, *three seconds;* eclipse, *one second.* It is visible in clear weather from a distance of 17 miles.

A *fixed white* light is shown at an elevation of 25 feet above the sea, from an iron post, 16 feet in height, on the head of Jetée Joinville; in clear weather it is visible from a distance of 4 miles, but it is possible that it may not be lighted in very bad weather.

A *fixed green* light is exhibited from Quai du Nord, the north side of entrance to Camber. On the south side of entrance a *fixed red* light is exhibited, at an elevation of 19 feet above the sea, from a tripod on a masonry base, the whole 15 feet high; it is visible in clear weather from a distance of 3 miles.

Jetée Joinville.—From Îlot Joinville a small jetty, Jetée Joinville, extends for half a cable in an easterly direction; the area between the end of the jetty and the northern side of the entrance to the harbour is obstructed with blocks of stone, nearly awash, which extend one-tenth of a cable eastward of a line joining these points; some of the blocks having 2 feet water over them.

Beacon.—Ecueil du Grand Hammam, 1¼ cables north-eastward from the jetty end, is marked by a black turret beacon.

Mooring buoy.—A mooring buoy for mail boats lies 1½ cables northward of Îlot Joinville.

Anchorage.—The anchorage outside is very bad, and exposed to all prevailing winds. Small vessels secure inside either alongside the Quai du Nord, or the Quai de la Douane.

Directions.—Entering by day, leave Ecueil du Grand Hammam with black turret beacon on the port hand, and steer for the fort, in ruins, at the head of the bay, bearing 185° true. By night, keep the

General charts 1766, 2158a, 449.

Plan of Port Shershel on 1766. Var. 11° 50′ W.

white light, on Jetée Joinville, in line with the *green* light, on Quai du Nord, bearing 202° true, until the beacon is passed, when the *green* light may be slightly opened southward of the *white* light, passing about a third of a cable eastward of them.

Town. — The town of Shershel and suburbs, containing in 1910 about 12,000 inhabitants, is surrounded by a wall, and stands, like an amphitheatre, on the site of Julia Cæsarea of the Romans; there are some seams of coal in the vicinity of the town, but they are not rich enough to work.

Supplies. — Few supplies are to be had, but good water may be obtained from a cock on the quay.

Life-saving station. — A rocket apparatus is maintained at Shershel.

Chart 1909, Cape Ivi to Algiers.

Coast.—From Port Shershel the coast is of moderate height, steep and rocky; Cap Blanc (*Lat. 36° 37′ N., Long. 2° 15′ E.*), 2½ miles eastward, has yellowish white coloured cliffs on its western side, and on its eastern side there is a bay, about a mile in width, into which flows the Wadi el Hashem, which, receiving all the water flowing south from Le Chenua mountains, at times has a considerable outflow. Ras el Amesfut, the eastern point of this bay, has three islets and some rocks extending off it; the farthest off-shore being distant 3¼ cables.

Le Chenua is the general name given to a group of mountains which form this part of the coast, and are visible a long distance from seaward; the highest point, 2,959 feet above the sea, is situated about 2 miles inland (*see* view on pages 350, 357). Along this part of the coast there are breaks in the cliffs with beaches, and at the foot of the cliffs, rocks and islets, which do not generally extend farther than 3 cables from the coast.

Ecueil du Sphinx, 5 miles eastward of Port Shershel, and a long half-mile from the shore, are two conical rocks, 2 cables in extent in a north-easterly and south-westerly direction, rising from 8 and 11 fathoms water, and near each other. On the north-eastern head there is a depth of 6 feet, on the south-western head from 16 to 19 feet, and in the channel between them and the shore, there are detached rocks with depths of 2½ fathoms.

Clearing mark.—The steeple at the village of Novi in line with Îlot Joinville lighthouse, bearing 242° true, leads to the northward of Ecueil du Sphinx.

Coast. — Pointe Berinshel and islet, 4½ miles eastward of Ras el Amesfut, are easily recognised by the latter, which is 66 feet high, and

General charts 1766, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 11° 50′ W.

lies 2 cables northward of the point; it has rocks extending north-eastward and westward of it, and should not be approached within a distance of 2 cables. At 4½ cables westward of the islet there is a shoal with 3¼ fathoms water over it.

Ras el Amuch, 3 miles to the eastward of Pointe Berinshel, is rounded in form and the eastern termination of Le Chenua mountains; some rocks at its foot extend nearly a cable off shore, and between it and the point are two small islets lying about 2 cables from the coast. The mountains over this headland are separated from other larger and more elevated ranges in the interior by a deep valley; from the westward Ras el Amuch appears like a peninsula. With easterly winds, Le Chenua mountains are covered with light clouds.

Signal station (*Lat. 36° 38′ N., Long. 2° 24′ E.*). — There is a semaphore station on Ras el Amuch. Call letters by International code, A.K.Y.P.

Coast. — Ras Sidi-Ferruch lies 23 miles eastward from Ras el Amuch, the coast between forming a bay nearly 5 miles deep, the shore of which is fronted by cliffs of moderate height with sandy beaches, some of which are extensive; at a mile from the shore there are from 12 to 20 fathoms water, over muddy sand.

Baie de Chenua, on the east side of Ras el Amuch, has a sandy beach, in the middle of which the Wadi Nador enters the sea; to the southward of Ras el Amuch is Pointe Chenua, and between is Anse des Carrieres, a small cove, on the south-eastern angle of which are some quarries of fine marble. On the south side of the cove is a large house, and on Pointe Chenua some works, a road runs from the creek to the signal station at Ras el Amuch; further southward in the bay are several caves in the cliffs, known as the Grottes du Nador.

Anchorage.—The bay affords good shelter from westerly winds, but vessels should leave immediately there is any indication of winds from N.N.W. round to East; north-westerly winds also send in a heavy swell, which makes the anchorage most uncomfortable. The best anchorage is at about 2 cables from the shore, in about 7 to 8 fathoms water over sandy bottom, off the caves in the cliffs. There is also anchorage with westerly winds in Anse des Carrieres, for small vessels, about 150 yards from the beach in 5 fathoms sand and flat rock.

Plan of Port Tipaza on 1766.

PORT TIPAZA.—The coast of Baie du Chenua terminates to the eastward in a group of hillocks, whose north-eastern point is Ras el Kalia (Cap Tipaza), the western point of the small bay of Tipaza, open to winds from N.N.W. to East; half a mile to the eastward are Jezirat Sidi Saïd, forming the eastern side of the bay and joined to the coast by shoal water.

General charts 1766, 2158a, 449.

Plan of Port Tipaza on 1766. Var. 11° 50′ W.

Light (*Lat. 36° 36′ N., Long. 2° 26′ E.*). — On Ras el Kalia is a square light grey tower 38 feet in height, and with a rose-grey building, which exhibits, at an elevation of 102 feet above the sea, a *fixed green* light, which is visible in clear weather from a distance of 5 miles.

Rocks. — A rocky flat, 2 cables in length east and west, and with 4¼ fathoms water over it, lies bearing 42° true, distant 4½ cables, from the lighthouse, and the 5 fathoms line is distant 1¾ cables northward of Jezirat Sidi Saïd.

Anchorage. — Large vessels anchor in from 11 to 16 fathoms water, outside the rocky flat above mentioned; small vessels, south of the bank, and about 2¾ cables east of the lighthouse, in depths of from 6½ to 7½ fathoms, and in fine weather they may anchor off the custom house in 4¼ fathoms.

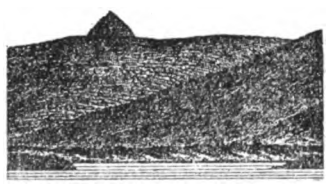
Town. — The small town of Tipaza, built near the ruins of the ancient town, had a population in 1910 of about 2,700; the remains of a port, constructed by the Romans, are inside Jezirat Sidi Saïd.

Life-saving station.—A station, to afford assistance in case of shipwreck, is maintained at Tipaza.

Landing.—The landing mole is situated in front of the town, and has about 8 feet of water on its eastern side; it is exposed to the sea, with on-shore winds, and landing is then difficult or impossible; two rocks lie north-eastward and south-eastward, respectively, 90 and 120 yards distant from the north-east angle of the mole end, and must be avoided.

Chart 1909, Cape Ivi to Algiers.

Coast.—Eastward of Tipaza, for a distance of nearly 20 miles, the coast is backed by a ridge of hills from 650 to 920 feet high, which runs parallel to, and from 1½ to 2 miles from, it. At about 5 miles eastward of Tipaza, and on this ridge, there is a remarkable monument named Kobr-er Rumaïa or Tombeau de la Chrétienne, which forms an excellent mark from seaward; it is 108 feet in height above



Kobr-er Rumaïa or Tombeau de la Chrétienne, bearing 135° true, distant 3 miles.

the ridge, and 865 feet above the sea, cone shaped, slightly flattened at the top, and has the appearance of a large haystack. Beyond this

General charts 1766, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 11° 40′ W.

ridge are the plains of the interior, and south of it a dry lake named Hallula.

Along this coast there are several villages.

Bérard, a small agricultural village, 8 miles eastward of Tipaza, has, 1½ miles westward of it, a bank with about 3 fathoms water over it, situated 3 cables from the shore.

Tefchun, 3½ miles eastward of Bérard, is 387 feet above the sea, and has some important Roman ruins near it.

Castiglione, 1½ miles north-east of Tefchun, and situated on the shore, has a very abundant supply of water. Castiglione is at present (1911) the terminus of the coast railway, westward, from Algiers.

Life-saving station. — A rocket station is maintained at Castiglione.

Fuka, a village 2½ miles eastward of Castiglione, is 350 feet above the sea, and may be recognised, from seaward, by a group of houses situated near the sea and at the foot of the village.

Duauda, the last village visible from seaward on this part of the coast, is 350 feet above the sea, and in its vicinity tobacco and cotton are cultivated.

Wadi Mazafran.—About 4 miles westward of Ras Sidi-Ferruch is the mouth of the Wadi Mazafran, one of the principal rivers in Algeria. It is distinguished at a distance by two hills, more elevated than the land near the coast, between which it runs, and the sandy beach terminates at this river. A mile eastward of its mouth is the marabut of Sidi Abd-el-Kader.

Anchorage. — In fine weather the whole of the coast between Tipaza and Wadi Mazafran affords anchorage, as it is clear and the depth regular; 5½ fathoms water, over sand and mud, will generally be found from one to 2½ cables from the shore, and, at twice that distance, about 11 fathoms, over sand and gravel.

Ras Sidi-Ferruch (*Lat. 36° 46′ N., Long. 2° 51′ E.*) is the extreme of a T-shaped promontory, the head of which is two-thirds of a mile in length; on it there is a conspicuous white marabut tower, and an earthwork battery.

The western point has off it two islets and some rocks; the eastern, one islet, and south of these on each side are two bays with extensive beaches and downs.

Rocks. — A small rock, with 13 feet water over, and 6 to 7 fathoms around it, lies about 1½ cables north-eastward of the western of the islets off the west point, and in the bay, on the east side, surrounded by depths of 4½ fathoms, there is a rocky flat, with 13 feet water, about 2 cables east of the point.

General charts 1766, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 11° 40′ W.

Water may be obtained from a rivulet flowing into the sea a mile southward of Ras Sidi-Ferruch.

Life-saving station.—A rocket station is maintained at Sidi-Ferruch.

Anchorages.—With easterly winds and in the fine season, good anchorage may be obtained south-westward, distant from 6½ to 8 cables of the west point of the promontory, in from 13 to 16 fathoms water; small vessels find anchorage, sheltered from north-easterly winds, in about 3 fathoms water, with good holding ground, in a creek to the westward of the point. On the east side, small vessels obtain sheltered anchorage from winds between S.W. and N.W. in another creek, but the swell is troublesome.

Ras Acrata, 3½ miles north-eastward of Ras Sidi-Ferruch, is low, projecting to the north-westward and forming the western extreme of the headland of Cap Caxine. The shore of the bay between Sidi-Ferruch and Ras Acrata is a sandy beach with numerous downs or sandhills covered with vegetation. Two small streams run into the bay, from which water may be obtained. There is shelter in this bay from easterly winds, but, as before mentioned, the bay on the west side of Ras Sidi-Ferruch is preferable.

It was in this bay that the French squadron anchored in 1830 for the conquest of Algeria; the army being entrenched on the headland of Sidi-Ferruch.

Guyotville. *Le Chenua.* *Ras Acrata, bearing 135° true, distant 4 miles.*

Guyotville, a town with about 3,500 inhabitants, is situated in the midst of vineyards about 1½ miles eastward of Ras Acrata, and between there is an island composed of madrepore, distant about a quarter of a cable from the coast.

Life-saving station.—A station, to afford assistance in case of shipwreck, is maintained at Guyotville.

Cap Caxine.—A large promontory, bordered with small cliffs, extends to the eastward, with a face to the north 8 miles in length, the most projecting point being named Pescade, 5½ miles eastward of Ras Acrata; the general name of the whole of this promontory is Cap Caxine, and Cap Caxine proper is a slightly projecting point 3 miles eastward of Ras Acrata.

LIGHT (*Lat. 36° 49′ N., Long. 2° 57′ E.*).—On Cap Caxine, a light-grey square tower, 108 feet in height, with a main building,

General charts 1766, 2158a, 449.

Chart 1909, Cape Ivi to Algiers. Var. 11° 40′ W.

exhibits, at an elevation of 210 feet above the sea, a *white flashing* light *every five seconds*, thus:—flash, *four-tenths of a second;* eclipse, *four and six-tenths of a second;* it is visible in clear weather from a distance of 21 miles.

Cap Caxine lighthouse, bearing 250° true, distant 2 miles. *Ras Acrata.*

Rocks.—One mile eastward of Cap Caxine several rocks lie off a projection of the coast, the outer of these, which is isolated, being 2 cables from the shore and bears 70° true, distant 9¼ cables from the lighthouse; it has about 3 feet water over it, with depths of 2½ to 3 fathoms around. Cap Matifu lighthouse open of Pointe Pescade, bearing 93° true, leads to the northward of this rock, but on account of the foul ground and breakers, in rough weather, vessels should pass at least one mile off this coast.

Pointe Pescade (*Lat. 36° 49′ N., Long. 3° 1′ E.*), 3 miles eastward of Cap Caxine, slopes gradually, while the rest of the coast terminates in steep cliffs and rocks; the point is divided in two by a cove, which is long and narrow, with a sandy beach at its head, where fishing boats often seek shelter, and off which are two islets.

Pointe Pescade is easily recognised by Jebel Bu Zarea, 1,352 feet high, commanding the whole face of the headland, and sloping gently to the point; on the eastern part of Pointe Pescade there are some picturesque ruins and an old Turkish fort. When seen from distances of 12 or 15 miles Jebel Bu Zarea appears isolated, in consequence of its eastern coast receding to Algiers bay, and the western coast to Ras Sidi-Ferruch. The coast between Cap Caxine and Pointe Pescade should not be approached within at least one mile.

Signal station.—About a mile south-eastward from Pointe Pescade, is Buzarea semaphore in telegraphic communication with Algiers; vessels can communicate by the International code. Call letters A.K.Y.L.

Life-saving station.—A station, to afford assistance in the event of shipwreck, is maintained at Pointe Pescade.

ALGIERS BAY, between Pointe Pescade and Cap Matifu, is about 10 miles wide and 4 miles deep, with gradually decreasing depths from about 40 fathoms, midway between the two capes, to the shore; it is open to the northward, and nearly surrounded by a clean sandy beach. Between the beach and the high land in the interior the large

Chart 1909, Cape Ivi to Algiers. Var. 11° 40′ W.

area of low land is much cultivated, and covered with gardens; there are several forts and batteries along the beach.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port of Algiers are **earnestly requested** to make use of the zone defined below, in which submarine vessels are prohibited from exercising submerged.

This zone is limited, as follows:—

(*a*) By the arc of a circle drawn with Notre Dame d'Afrique as centre, with a radius of 3 miles, meeting the coast to the eastward and westward.

(*b*) By the arc of a circle drawn with Cap Matifu semaphore as centre, with a radius of 3 miles, meeting the coast southward and eastward of the cape.

(*c*) By two lines joining the arcs of these circles, drawn parallel to the alignment, 253° true, of Fort l'Empereur and the Musoir du Nord lighthouse, and distant half a mile northward and southward, respectively, from it.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

Plan 2555, Port of Algiers.

West shore of the bay.—From Pointe Pescade (*Lat. 36° 49′ N., Long. 3° 1′ E.*) the coast rises rapidly, and forms the projecting angle of a plateau 328 feet above the sea; 1½ miles south-east of this plateau is the Church of Notre Dame d'Afrique, 407 feet above the sea, forming a good landmark, and north-westward of it is a seminary, also a conspicuous building. Another good landmark is an obelisk 165 feet high on the eastern face of Fort l'Empereur, which lies about three-quarters of a mile westward of the port, and is 709 feet above the sea.

Pointe des Consuls, one mile south-eastward of Pointe Pescade, projects slightly, and has some rocks extending about 1½ cables north-eastward of it; from this the coast, broken, and formed of small cliffs, has a south-easterly direction, is covered with country houses, and the suburb of Saint Eugène occupies the coast for a distance of more than half a mile to Pointe des Anglais.

Shoal.—A rocky shoal, half a cable in extent, with from 13 to 16 feet water over it, lies 2¾ cables northward of Pointe des Anglais.

Ras el Ketani.—Between Pointe des Anglais and Ras el Ketani, a distance of 7 cables, there is a sandy shore, known as Baie de Saltpetre, and on its north-west side is l'Hopital Militaire du Dey. Ras el Ketani, formed by the projecting fortifications of Algiers, is surrounded by rocks, which extend about a cable to the northward and 3 cables to the eastward.

General charts 1766, 2158a, 449.

Plan 2555, Port of Algiers. Var. 11° 40′ W.

Roche M'Tahen, on which the sea breaks with easterly winds, lies near the extreme of a chain of rocks and shoal ground, extending 3 cables eastward from Ras el Ketani, are nearly awash, and have shoal water half a cable eastward of them.

The two islets off Pointe Pescade, open of Pointe des Consuls, bearing about 298° true, lead to the north-eastward by day; keeping in the *white* sector of the light on the Musoir du Nord leads to the eastward at night.

PORT of ALGIERS (*Lat. 35° 47′ N., Long. 3° 4′ E.*). — The Port of Algiers is 9 cables in length in a northerly and southerly direction, with an average breadth of 3 cables, and an area of about 173 acres.

The port is formed on the north by a mole joining Presque' île de l'Amirauté to the north part of the town, and from the south point of Presqu' île de l'Amirauté a mole, Musoir du Nord, curves to the south-eastward for a distance of about 900 yards. Jetée du Sud extends from a point on the shore opposite Fort Babazun in an easterly direction for a distance of about 200 yards. Jetée de l'Est (detached mole) extends from Fort du Coude in a north-north-easterly direction for about 900 yards, terminating in Musoir du Sud. Jetée de l'Est also extends from Fort du Coude in a south-easterly direction for a distance of about 840 yards. This arm forms the eastern breakwater of l'Arriere-Port de l'Agha. There are two short arms inside the eastern breakwater, the northern one, about 80 yards long, extends westward from Fort du Coude, and forms, with Jetée du Sud, of the Port of Algiers, the entrance between that harbour and l'Arriere-Port de l'Agha; the southern one, 120 yards long, forms, with Grand Môle, the southern entrance to l'Arriere-Port de l'Agha.

Arriere-Port de l'Agha. — Arriere-Port de l'Agha lies immediately southward of the Port of Algiers, and is about 42 acres in extent; it is formed by Grand Môle at its southern end, extending from the shore in an easterly direction for a distance of about 700 yards; Jetée du Sud, of the Port of Algiers, on the southern side of which is Môle Amiral Mouchez; and Jetée de l'Est, southern arm, named Jetée de l'Agha. Môle á Minerais, parallel to the Grand Môle, extends from the western side of the port at one cable northward of it.

Harbour works are in progress at the northern and southern parts of l'Arriere-Port de l'Agha.

A new jetty about 380 yards long lies one cable southward and parallel to Grand Môle.

Entrances.—The entrance to Port of Algiers, between the breakwaters, is about one cable in width.

The entrance of l'Arriere-Port de l'Agha from the southward is about 100 yards wide.

General charts 1909, 1910, 1766, 2158a, 449.

Plan 2555, Port of Algiers. Var. 11° 40′ W.

The entrance from l'Arriere-Port de l'Agha into the Port of Algiers is about 80 yards wide.

Inward-bound vessels must remain outside this entrance until outward-bound vessels have cleared the port.

Rock. — A rock, with 2¾ fathoms over it, lies near the southern entrance to l'Arriere-Port de l'Agha, 5½ cables south-eastward of the light-structure on the outer end of Grand Môle, and about 2½ cables from the shore. The *fixed red* light on the new jetty is obscured over this rock.

Depths.—In the entrance to the Port of Algiers there is a depth of 11 to 12 fathoms; in the eastern part of the port 9 to 10 fathoms; in the western part the depths vary from 1½ to 5 fathoms.

In the southern entrance to l'Arriere-Port de l'Agha there is a depth of 6 fathoms. In l'Arriere-Port de l'Agha there are depths of 2½ to 8 fathoms; and in the channel between l'Arriere-Port de l'Agha and the Port of Algiers there is a depth of 5½ fathoms.

LIGHTS (*Lat. 36° 47′ N., Long. 3° 4′ E.*). — On Presque' île de l'Amirauté is a white octagonal tower, 52 feet in height, which exhibits, at an elevation of 115 feet above the sea, an occulting *red* and *white* light *every five seconds*, showing light, *four seconds;* eclipse, *one second;* the *white* light is visible in clear weather from a distance of 10 miles, and the *red* light from a distance of 6 miles. For sectors, *see* Light list and plan.

Musoir du Nord.—A *group occulting green* and *white* light, showing groups of *two* eclipses *every eight seconds*, thus:—light, *four and seven-tenth seconds;* eclipse, *six-tenths of a second;* light, *two and one-tenth seconds;* eclipse, *six-tenths of a second.* This light is exhibited at an elevation of 45 feet from a square grey tower, 10 feet in height, attached to a hut with a red roof, and situated about 220 yards within the outer extremity of Musoir du Nord. The *white* and *green* sectors are visible from distances of 12 miles and 7 miles, respectively. For sectors, *see* Light list and plan.

Musoir du Sud.—A *fixed red* light is shown at 190 yards within the northern extreme of Musoir de Sud from a building similar to that on the north mole, and at an elevation of 42 feet above the sea; it is visible in clear weather from a distance of 5 miles. For arc of visibility, *see* Light list and plan.

Arriere-Port de l'Agha. — Southern entrance.—On the eastern side, at the extremity of the entrance mole, a white cylindrical tower, 28 feet high, exhibits, at an elevation of 37 feet above the sea, a *fixed green* light, visible from a distance of 5 miles.

On the western side, at the extremity of Grand Môle, from a similar tower, and at the same height as the previous light, is exhibited a *fixed*

General charts 1909, 1910, 1766, 2158a, 449.

Plan 2555; Port of Algiers. Var. 11° 40′ W.

red light with a *white* sector. The *white* sector is visible from a distance of 10 miles, and *red* light from a distance of 6 miles. For arcs of visibility and sectors of these lights, *see* Light list and plan.

Northern entrance.—Between Port of Algiers and l'Arriere-Port de l'Agha, the entrance is lighted by a *fixed green* light on the eastern side, and a *fixed red* light on the western side. The lights are exhibited on wooden posts 10 feet high, at an elevation of 14 feet above the sea. For arcs of visibility, *see* Light list and plan.

New jetty.—On the outer end of New jetty, situated southward of Grand Môle, from an iron column 16 feet in height, is exhibited, at an elevation of 25 feet above the sea, a *fixed red* light, which is visible in clear weather from a distance of 4 miles. For arc of visibility, *see* Light list and plan.

Light-buoys.—A red conical buoy, showing a *fixed green* light, is moored 140 yards eastward of the extremity of Musoir du Nord.

A black conical buoy, showing a *fixed red* light, is moored off the northern extremity of Musoir du Sud; the entrance to Port of Algiers is between this buoy and Musoir du Nord.

A red buoy, showing a *fixed green* light, is moored near the southern extremity of the Jetée de l'Est, at the southern entrance to l'Arriere-Port de l'Agha.

A black buoy, exhibiting a *fixed red* light, is moored south-eastward of the outer end of the new jetty, situated southward of Grand Môle.

Rock (*Lat. 36° 47′ N., Long. 3° 4′ E.*).—Roche Sans Nom, a small shoal with 5½ fathoms water, lies in the centre of the harbour, about a cable eastward of Môle Al-Djefna. Blasting operations are still in progress. The blasting vessel is moored with six anchors over the rock. The position of each anchor is marked by a red flag by day and a red light by night. The blasting vessel also exhibits at night a *white* light in the bows and the stern.

Tug.—A powerful tug can be obtained.

Pilots. — Pilots go off to vessels in a steam boat when they are about half a mile from the entrance of the harbour, and indicate the berth to which the vessel has to proceed.

Signal station.—Vessels of war communicate with the Admiral commanding by the flagstaff on the Admiralty buildings, Presque' île de l'Amirauté.

The arrival of vessels is announced by the semaphore at Buzarea or Matifu.

Mooring.—Vessels are moored with their sterns secured to Môle Al-Djefna; the largest, on the north-eastern side, are sometimes secured with their sterns to the shore. Vessels are also moored with their sterns secured to the east mole.

Plan 2555, and charts 1910, 1766.

Outer anchorages.—Large vessels may anchor off the northern

General charts 1909, 1910, 1766, 2158a, 449.

Plan 2555, and charts 1910, 1766. Var. 11° 40′ W.

mole, in 22 or 25 fathoms water, over black mud and good holding ground. A fair berth is with the Presque' île de l'Amirauté lighthouse bearing about 300° true, and Musoir du Nord lighthouse, 256° true, distant 3½ cables; or farther out if necessary. This anchorage is dangerous in winter, with northerly and north-easterly gales, and vessels should leave the anchorage or go inside on any sign of these winds. In summer a vessel may lie here without much risk, but the sea which sets in from the north is inconvenient.

Vessels also anchor with the entrance bearing between 356° and 358° true south-eastward of Musoir du Sud.

There is anchorage during easterly winds under Cap Matifu, in from 10 to 15 fathoms water, over muddy sand, off the old Turkish fort, between the cape and Wadi Hamiz.

Directions.—From a distance seaward the position of Algiers will be known by the high land over Pointe Pescade, which, seen from beyond the distance of 15 miles, appears isolated from all points of the compass. The second chain of mountains, which rises from 15 to 20 miles in the interior, leave between it and Jebel Bu Zarea the plain of Metidja.

Jebel Muzaia, 5,120 feet high, one of the most conspicuous of this second range, descends rapidly to the eastward, but has a long slope westward. *See* view on chart 1910.

Jebel Mecaud, 4,620 feet high, is another mountain, more extended, and eastward of the latter, and between, there is apparently a remarkable break, which is open when northward of Cap Caxine. The summits of these mountains are south-westward, distant 30 miles, and 27 miles from Algiers.

Jebel Bu Zegzag, 3,396 feet high, 30 miles eastward of the latter, is remarkable from its rugged outline. On nearing Algiers, the obelisk on Fort l'Empereur, the several forts on the heights, the signal station near Jebel Bu Zarea, the city in the form of a large white triangular patch, the numerous villas and country houses, the Presque'île de l'Amirauté lighthouse, and the extensive mole with the shipping, will be successively seen.

Vessels coming from the westward, after passing Pointe des Consuls, should not approach the shore nearer than a distance of half a mile, to avoid the rocky shoal, northward of Pointe des Anglaise and Roche M'Tahen. *See* pages 359, 360.

Entering the port of Algiers, pass outside the light-buoy off the end of Musoir du Nord, and northward of the light-buoy marking the northern extremity of Musoir du Sud, and between it and Musoir du Nord, the channel being about three-quarters of a cable in width.

Entering l'Arriere-Port de l'Agha from the southward, pass outside

Plan 2555, Port of Algiers. Var. 11° 40′ W.

the light-buoy off the south extreme of Jetée de l'Agha, and then steer for the entrance.

The black light-buoy kept open to the southward of the light-structure on new jetty leads to the northward of the shoal ground.

CAUTION. — Great caution is necessary in entering l'Arriere-Port from the southward, with strong N. to N.E. winds. Vessels should always approach well from the eastward.

By night. — The light on Musoir du Nord, showing *occulting white*, and bearing 180° true, leads about 3 cables eastward of Roche M'Tahen, when a 165° true course should lead about a cable eastward of the light-buoy (*fixed green* light) off the end of Musoir du Nord, and into the *red* sector of Musoir du Sud *fixed* light and the *green* sector of the Musoir du Nord *occulting* light; from this, if proceeding into Port of Algiers, steer between Musoir du Nord light and the light-buoy, showing a *fixed red* light, and marking the northern extreme of Musoir du Sud, into the harbour, taking care not to get into the *red* sector of Presque' île de l'Amirauté *occulting* light until inside the entrance.

If entering l'Arriere-Port de l'Agha from the southward, keep in the *green fixed* light on the northern side of the entrance and the *red fixed* light on the new jetty until abreast the buoy showing a *red fixed* light, when the entrance may be steered for. The *red fixed* light on a buoy kept open to the southward of the *red fixed* light on new jetty leads to the northward of shoal ground near entrance.

In leaving the anchorage of Algiers with easterly winds under sail, vessels generally stand southward towards the mouth of the Wadi Harrach, but care should be taken not to approach it too closely, as the bank extends some distance off. It is seldom, even in summer, that there is not a surf all along the beach. The current within the bay, particularly at the anchorage, generally sets to the northward.

Town (*Lat. 36° 47′ N., Long. 3° 4′ E.*). — Algiers, the Iomnioum of the Romans, and Al Jezirat (the island) of the Arabs, is the capital of the French North African possessions, under the name of Alger, and stands like an amphitheatre on the eastern face of a steep hill nearly 400 feet above the sea. The white houses rise one above the other, in a triangular form, with the longest side next the shore, and the apex crowned by the kasba or citadel.

The town is surrounded by a high thick wall more than 3 miles in circuit, flanked by towers and bastions, with various water-side batteries; the whole being conspicuous at sea from a great distance. It contains numerous churches, mosques, a royal college, an excellent civil hospital (at which sailors are received), and other public buildings.

The environs of Algiers are very beautiful, and for some miles round

General charts 1909, 1910, 1766, 2158a, 449.

Plan 2555, Port of Algiers. Var. 11° 40′ W.

are interspersed with great numbers of elegant villas. There are three suburbs, St. Eugène, previously mentioned, Mustapha, and Belcourt.

About a mile southward of the citadel are the remains of Sultan Kalessi (fort of the emperor); it was about a quarter of a mile in circumference, and built in one night by the Emperor Charles V., who encamped here in the year 1541. The hill on which it stood is 730 feet above the sea, and commands the town; the fort was blown up at the conquest of Algiers.

The population of Algiers was, in 1910, 145,320, of whom 33,250 were non-Europeans.

A British Consul-General and a Vice-Consul reside here.

Communications.—Steamship communication with Liverpool or Malta every fortnight; with Marseille, four times weekly; a weekly coastal service with Tunis; railway communication westward to Oran, eastward to Tunis, with various branches. There are electric tramways in the city. A wireless telegraph station at Fort de l'Eau, about 12 miles eastward of Algiers. Four submarine cables connect Algiers with Marseille, and there is telegraphic communication with all parts. The telegraph office is always open. *See* also page 20.

Coal and supplies. — About 46,000 tons of coal are kept in stock amongst various firms, and coaling is carried on by baskets; from 1,200 to 1,800 tons can be put on board in 24 hours, but depending largely on the facilities afforded by bunker space. There are 200 lighters, holding from 100 to 160 tons. Each firm keeps a minimum of 800 tons afloat; the lighters are moored in two lines south-westward of the lighthouse on Musoir du Sud. Fresh provisions are plentiful, and very good spring water is brought off in screw tugs; the charge is 3 francs a ton, with a minimum charge of 9 francs.

Docks. — There are two Government docks and a small floating dock; for particulars, *see* Appendix I.

Repairs.—Large repairs of almost any description can be executed with facility at the Government docks, and the largest vessels may be repaired. There are three or four floating cranes; the largest can lift 60 tons.

Chronometers.—A clock, placed in the town hall in the Boulevard de la Republic, shows accurate mean time of Paris Observatory. Chronometers may be rated by this clock, as it is corrected twice a week, by telegraph from Buzarea Observatory, and a table near the clock gives the error and rate. It is reported to be inaccurate. Meteorological charts, showing the state of the weather, are posted in the town hall, and may also be obtained from the Meteorological office.

Life-saving station.—A lifeboat is stationed in the port, and a steam tug is equipped with a life-saving gun. There are also stations to afford assistance at the lighthouse, and the Custom-houses at Algiers and Plaga de Mustapha.

General charts 1909, 1910, 1766, 2158a, 449.

Plan 2555, Port of Algiers. Var. 11° 40′ W.

Quarantine. — The bill of health should be sent to the Health office, situated at the extreme of Jetée du Sud of the Port of Algiers. Vessels arriving from infected ports anchor in l'Arriere-Port de l'Agha; the lazaretto is at Cap Matifu. *See* page 367.

Trade. — The principal exports consist of wine, iron ore, sheep, spirits and liquors, cereals, phosphates, fruit, vegetables, and tobacco: and the imports of coal, beer, spirits and liquors, building materials, wines, and French goods.

Shipping. — In 1910, 2,380 vessels, with a total tonnage of 3,277,381 tons, entered the port. The Port of Algiers takes nearly 50 per cent. of the trade of Algeria.

Climate. — The scirocco, or desert wind, is in winter merely a pleasantly warm dry breeze, but in summer during its continuance the temperature will rise to 100° Fah. in the shade on the beach, and inland much higher. The sky becomes dim and the air is charged with fine sand. When the scirocco is not blowing, the nights, even during the hottest season, are cool and the dew copious. *See* also page 21.

October to March inclusive is the wet season at Algiers. In April and May there is but little rain, and the remaining months of the year are almost rainless. The first rains after the long summer's drought are the heaviest, and usually occur in October, but most rain falls in November and December. Rain falls on an average about 120 days in the year, usually coming with north-westerly winds and cold. *See* Meteorological table in Appendix III.

Chart 1910, Algiers to Cape Bougaroni. Var. 11° 40′ W.

Coast.—At 3 miles eastward of Algiers, on one of the prominent points of the coast, is Seminaire de Kuba, the church of which, visible from all parts of the bay, has a dome 420 feet above the sea, and at the foot of this is the village of Hussein Dey, from which eastward the coast is covered with houses and buildings near which runs the railway to Blidah.

The Wadi Harrach runs into the sea 2 miles eastward of Hussein Dey, at the foot of a little hill 197 feet above the sea, and beyond its mouth is the village of Maison Carree and a monastery. From this to the eastward the coast is flat, sandy, and devoid of houses to the village of Fort de l'Eau (*Lat. 36° 45′ N., Long. 3° 12′ E.*), from whence the land rises and trends to the north-eastward and northward to Cap Matifu.

The Wadi Hamiz enters the sea about 2 miles southward of Cap Matifu, and between a bank extends about 3 cables seaward; an isolated rock, with a depth of 3 feet over it, lies about 1½ cables from the shore, in front of a small creek, close southward of the cape.

Wireless telegraph. — A wireless telegraph station has been

General charts 1909, 1910, 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 11° 30′ W.

established about three-quarters of a mile westward of Fort de l'Eau. It is open to the public at all times; call letters U F O.

Life-saving station.—A rocket apparatus is maintained at Fort de l'Eau village.

Cap Matifu.—This headland is low, with a front to the northward 2 miles in extent, and on its eastern part is a hill with a flat

top, having on it a fort, and the same appearance from every direction, and at distances of from 15 to 16 miles resembling an island. The lighthouse and signal station of Cap Matifu come in sight as soon as the hill itself The fishing village of Jean-Bart overlooks the east point of the cape. *See* also view on chart.

LIGHT (*Lat. 36° 49′ N., Long. 3° 15′ E.*).—On the northern edge of the flat-topped hill, and about a mile from the western extreme point of the cape, is a square white tower, 36 feet in height, with main building attached, exhibiting, at an elevation of 242 feet above the sea, a *group flashing white* light, showing *three* flashes *every fifteen seconds*, thus:—flash, eclipse, *three seconds;* flash, eclipse, *three seconds;* flash, eclipse, *nine seconds;* it is visible in clear weather from a distance of 22 miles.

Signal station.—Semaphore.—At about 100 yards to the north-westward of the lighthouse, just below, on the slope, is a signal station and semaphore which is in telegraphic communication with all parts, and vessels can communicate by the International code of signals. Call letters A.K.Y.J.

Dangers.—The coast of the cape is fronted by cliffs, with detached rocks here and there, which, at the west end, extend 3 cables from the shore.

A rock, with a depth of 1½ fathoms over, and 11 fathoms around, lies one-third of a mile northward of the northern extreme of Cap Matifu, and, in-shore of this rock, there are others with depths of from 1½ to 2 fathoms over them, therefore the point should have a berth of at least half a mile when passing it.

Le Rocher well open to the left of Îles Sanja leads to the northward of this rock.

Anse de Matifu.—Quarantine anchorage.—Anse de Matifu, south-westward of the lighthouse, affords anchorage in depths of from 5½ to 9 fathoms, with good shelter from north-easterly

General charts 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 11° 30′ W.

and easterly winds. Here vessels from Algiers generally do their quarantine. People can be landed and lodged in the buildings near the point.

Landing. — There is a landing place at the fishing village of Lapérouse, which lies at the bottom of the creek near the anchorage.

Life-saving station. — A station, to afford assistance in the event of shipwreck, is maintained at l'Anse de Matifu.

Tunny fishery. — Tunny nets are laid out during the season, April to the end of October, for a distance of 6½ cables in a westerly direction from the old Turkish fort southward of Cap Matifu. The body of the net is marked by day with a large buoy at each of the four angles; by night with two *red* lights exhibited from boats, one moored at the northern end of the floating part of the net, the other moored about 50 yards north-westward of the south-west angle of the body of the net. *See* also Caution, page 73. The buoys are not always visible, and vessels wishing to make the anchorage of l'Anse de Matifu should keep the lighthouse open to the right of the point, extending to the southward of the old Turkish fort, bearing 64° true; this will lead to the southward of the tunny nets.

Banc de Matifu, situated about 2 miles northward of the western extreme of Cap Matifu, is a rocky shoal about a quarter of a mile in extent, with 4¾ fathoms water over it, and from 9 to 18 fathoms around. Between the shoal and the shore there are depths of from 20 to 38 fathoms, gravel and shells. The currents are very strong about this shoal, and vessels should avoid crossing it. The summit of Jebel Bu Zegzag well open west of the lighthouse, bearing about 141° true, leads to the westward of the shoal, and the same summit open eastward of Îles Sanja, bearing about 151° true, leads to the eastward.

At night, Matifu light, bearing between 255° true and 245° true, will clear Le Rocher, and all the lights of Algiers kept open of the western point of Cap Matifu, on a bearing of 250° true, will lead northward of the dangers off Cap Matifu, also Îles Sanja.

General charts 1766, 2158a, 449.

CHAPTER VI.

THE COAST OF AFRICA.—CAP MATIFU TO JEZIRAT EL JERBA; GALITA ISLAND AND SORELLE ROCKS.

(*Lat. 37° 40′ N. to Lat. 33° 30′ N.*)
(*Long. 3° 10′ E. to Long. 11° 50′ E.*)

VARIATION in 1912—decreasing about 6′ annually.

ALGERIA—*continued.*

Chart 1910, Algiers to Cape Bougaroni. Var. 11° 30′ W.

Îles Sanja (*Lat. 36° 49′ N., Long. 3° 16′ E.*) lie off the north-eastern part of Cap Matifu, half a mile from the coast, and have no dangers outside them; the largest is about 32 feet above the sea, but at times the mirage gives it a much larger appearance, and it may be mistaken for a sail. Small vessels pass between these islets and the mainland, in the passage with about 7 feet water. *See* view on page 367.

Another black round islet, named Le Rocher, about 8 feet above the sea, lies 2 miles eastward from Îles Sanja, and 1½ miles from the coast. A ridge of rocks extends nearly half a cable eastward, and shoal water about the same distance westward.

Coast.—From abreast Îles Sanja, a little eastward of Cap Matifu, the coast forms an extensive sandy beach 32 miles in length, which terminates near Cap Bengut, interrupted here and there by cliffy points, the beach is sinuous, low, and backed by sandhills. From the point eastward of Cap Matifu the coast has an easterly direction, and is formed of a sandy beach, broken by several rocky points which are prolonged under water by rocks and shoals, so that this part of the coast must not be approached too closely.

When passing at 10 or 12 miles from the coast the beach is not seen, and the appearance is that of a deep bay bounded by the mountains beyond the plains of Metidja.

Shoal. — A rocky shoal, with 4½ fathoms water over it, steep-to, and surrounded by depths of from 11 to 16 fathoms, is situated 1½ miles eastward of Le Rocher. Îles Sanja open to the northward of Le Rocher, bearing about 273° true, leads to the northward.

General charts 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 11° 30′ W.

Anchorages.—The coast to Cap Bougaroni affords no anchorage, sheltered from all winds, for vessels of heavy draught; except the Port of Algiers, the anchorage of Bougie, with shallow water near the shore, is the only place where small vessels may attempt to winter. The anchorages of Fort Genois, Bona, and Galita island are good during the summer; and Genois affords most security during the winter.

Anchorage of a temporary character may be obtained at Matifu, Jinned, Dellys, Mers el Farm, and Bougie to the west of Cap Bougaroni: Collo, Stora, Cap de Fer, Tukush, and Tabarka to the eastward, but they should on no account be used with on-shore winds.

Îlots Aguelli (*Lat. 36° 48′ N., Long. 3° 21′ E.*). — A group of islets or rocks named Aguelli, the highest 82 feet above the sea, lies nearly a mile from the coast, and 4¾ miles eastward of Îles Sanja; it extends north and south about 3 cables, and affords some little shelter to small vessels both from easterly and westerly winds; the best anchorage being about one cable eastward of the centre of the group, in from 6 to 8 fathoms water, over rocky bottom; to obtain sand it is necessary to anchor further out.

A rocky patch with about 1½ feet water over it, lies 1½ cables south-westward of the south point of the islets, and a rock about a quarter of a cable north-eastward of the group; the channel between it and the mainland may be used by coasters.

Coast. — Between Îlots Aguelli and Jezirat el Kadra, a distance of 7½ miles, there is a sandy beach, through which several small streams enter the sea, the eastern of which, the Wadi Bu Merdass, may be recognised by Rocher Pourri, near its mouth; Jezirat el Kadra is bordered by rocks, extending seaward for a distance of 3 cables. To the eastward of the point there is a small bay, named Hadjer Makhluf, affording good shelter from easterly wind, and landing may be effected; rocks with a least depth of 8 feet over them extend 1¾ cables, north-west of the south side of this bay.

El Achaichi is the termination of a range of mountains extending about 3 or 4 miles in a north-westerly and south-easterly direction, the most remarkable summit being Bukaruk, 1,457 feet, and Sidi Fereje, 1,483 feet high, and visible from all directions; at 2½ miles eastward of El Achaichi there is a double, rocky point, westward of which is Mers el Hajeje.

The Wadi Isser, one of the most important streams in Eastern Algeria, winds through low undulating land and enters the sea 6 miles eastward of Mers el Hajeje, but its mouth is obstructed by banks of sand.

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Chart 1910, Algiers to Cape Bougaroni. Var. 11° 20′ W.

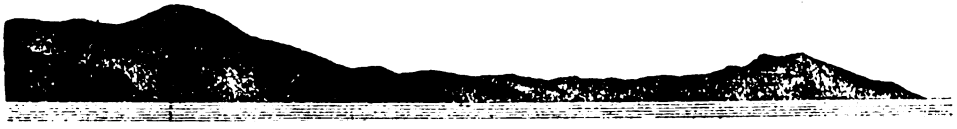
Ras Jinned, about 23 miles eastward of Cap Matifu, is the termination of Jebel Jinned, 1,447 feet high; it projects to the north-westward, forming a small bay named Marsa Jinned, which affords shelter from the eastward. A rock, with a depth of 5 feet over, and 13 feet around it, lies south-westward, distant 2 cables from Ras Jinned. Foul ground exists inshore of the rock, and for a distance of 2 cables northward of the point.

Jebel Jinned, bearing 70° true, distant 20 miles. *Jebel Bubrac, distant 25 miles.*

Coast.—From Ras Jinned a sandy beach extends for 7½ miles in an easterly direction with depths of 10 fathoms about half a mile from the coast, to the mouth of the Wadi Sebau, and nearly midway the Wadi Arba flows into the sea; several rocks extend from the mouth of the Wadi Sebau to the 5-fathoms line of soundings, the outer having from 7 to 13 feet water over them.

From about a mile from the Wadi Sebau, the sandy beach is changed to a rocky coast, with cliffs, which extends to Cap Bengut.

Cap Bengut, of moderate height, and only a little salient, lies 32 miles eastward from the lighthouse on Cap Matifu, and is not seen from the northward. About 3½ miles westward of it is Jebel Bubrac, 1,962 feet high, and over the cape, about 1½ miles inland, the mountains attain an elevation of 1,227 feet.



Jebel Bubrac. *Jebel Jinned, bearing 233° true, distant 27 miles.*

On the northern and eastern sides of the cape are several rocks, which afford shelter to the fishing boats. A chain of these rocks in the form of a semicircle encloses a small space named Port Jardins (Port Couss); it gives complete shelter to coasters, and its greatest depth is 25 feet. Nearly 3 cables to the north-eastward of the port is an islet a little above water, and 1½ cables from the shore, to which it is connected by numerous other rocks.

LIGHT (*Lat. 36° 55′ N., Long. 3° 54′ E.*).—From a square masonry tower, 95 feet in height, erected on this cape, is exhibited a *white group flashing* light, showing groups of *four* flashes *every twenty-five seconds*, thus:—flash, *four-tenths of a second;* eclipse,

General charts 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 11° 20′ W.

two and seven-tenths of a second; flash, *four-tenths of a second;* eclipse, *two and seven-tenths of a second;* flash, *four-tenths of a second;* eclipse, *two and seven-tenths of a second;* flash, *four-tenths of a second;* eclipse, *fifteen and three-tenths of a second.* This light is elevated 208 feet above the sea, and is visible in clear weather from a distance of 21 miles.

Plan of Dellys on 1766.

BAIE DE DELLYS is bounded on the north side by Pointe de Dellys, which may be considered the eastern extreme of the headland of Cape Bengut. The point is long, narrow, rocky, projects to the north-eastward, and from it a reef extends in the same direction about 2 cables. The rocks near the point are uncovered, but those farther off have from 10 to 15 feet water on them, and there are depths of from 7 to 10 fathoms at about a quarter of a mile from the point. In approaching or leaving Baie de Dellys a wide berth should be given to the point.

Lights (*Lat. 36° 55′ N., Long. 3° 55′ E.*). — On the summit of Pointe de Dellys a *fixed red* light is exhibited, at an elevation of 131 feet above the sea, from a circular tower 21 feet in height; it is visible in clear weather from a distance of about 5 miles.

A *fixed green* light is shown from a post, about 70 yards from the end of the pier; it is visible from a distance of one mile in clear weather.

Pier. — A pier runs out from the beach near the centre of the town for a distance of 140 yards, eastward, and has a depth of 16 feet at the outer end; there is a 2-ton crane on this pier.

Wreck. — Buoy. — The wreck of the s.s. *Alger*, completely covered, lies 2½ cables southward of Pointe de Dellys lighthouse and three-quarters of a cable from the shore. A red conical buoy lies close to the wreck, and in fine weather a *fixed white* light of low power is shown from it.

Anchorage. — Baie de Dellys affords shelter from all westerly winds. Vessels may also lie here for temporary purposes with north-westerly winds during summer, but not in winter.

The best anchorage is in 8 to 9 fathoms, sand and broken shells, about 1¼ cables eastward of the pier, with the pier in line with the church, and a slaughter-house on the beach northward of the town in line with a mill.

Vessels can also anchor about 1½ cables south-south-eastward of the disused pier on Pointe de Dellys, and this anchorage has the advantage that landing can nearly always be safely effected inside

General charts 1766, 2158a, 449.

Plan of Dellys on 1766. Var. 11° 20′ W.

the old pier, whereas at the town pier, with any sea, landing is dangerous.

Northward of the parallel of the town pier the holding ground is good; southward of it the bottom is rocky and bad.

Directions.—There is a school-house, a large building with a red roof on the ridge of Pointe de Dellys; 4 cables south-eastward of the town pier a battery is constructed on a small point; and at one mile south-westward of the town a look-out house, which is a conspicuous white building, stands on the summit of a mountain, 1,197 feet high, which marks should be of assistance in making the anchorage.

Tala Aïcha, an isolated mountain remarkable by its summit appearing like a crater, rises 2,956 feet above the sea, about 8 miles south-eastward of Pointe de Dellys, and should also be a good mark for Dellys bay.

Current.—A weak easterly current is to be found for nine months of the year near Cap Bengut. A counter current to the westward will nearly always be found in Baie de Dellys, which, near the town, curves to the north-eastward and joins the main current by Pointe de Dellys.

Town. — The town of Dellys stands near the coast, about half a mile inside the point. The trade is insignificant, and there are few supplies obtainable.

Water may be obtained at the inner end of the pier.

Life-saving station.—A rocket apparatus is maintained here.

Chart 1910, Algiers to Cape Rougaroni.

Coast. — From Dellys the coast has an easterly direction for 11 miles, and is formed of alternately sandy beaches and rocky points; in addition to Tala Aïcha, the summits of Tumjaje, 1,427 feet, and Tissira Bu Srane, 2,310 feet high, and situated 1½ and 2½ miles from the coast respectively, are remarkable.

Between Dellys and Ras Sidi Slimane (*Lat.36°55′N., Long.3°58′E.*), 3 miles eastward, three small streams enter the sea, and on the left bank of the easternmost there is a tower and some abandoned saltpans. Pointe Messia, one mile further eastward, has a small beach on its eastern side, off which lie a number of rocks awash, and one-third of a mile north-north-eastward from the point is a pinnacle rock, with a depth of 3¼ fathoms over it, and 11 fathoms water around, and 2 cables northward from the point is another rock with 2¼ fathoms over it.

Ras Arbane Millia (White rock), 7 miles eastward of Dellys, is the most conspicuous point on this coast, being a large white rock,

Chart 1910, Algiers to Cape Bougaroni. Var. 11° 20′ W.

1½ cables in length and from 100 to 130 feet above the sea, lying parallel to the coast, its two extremes, detached from the coast, forming narrow creeks opening east and west.

Ras Tigzirt, 3 miles further eastward, may be recognised by the red roof of a little village of the same name, an islet, joined to the mainland by a submerged causeway of stones, lies off the point and 3 cables northward of the islet there is a bank of rocks, awash, the outer part of which lies 8 cables from the shore; in the channel, between this bank and the islet, there is a depth of 7 fathoms.

Anchorage. — Coasting vessels find anchorage, sheltered from easterly winds, to the westward of the islet.

Rock.—In the bay, between the islet and Cap Tedlés, there is a pinnacle rock, with a depth of 1½ fathoms over it, and surrounded by depths of from 8 to 11 fathoms; it lies about 6 cables eastward of the islet.

Life-saving station. — A station to afford assistance in the event of shipwreck is maintained at Tigzirt Custom-house.

Cap Tedlés (*Lat. 36° 55′ N., Long. 4° 9′ E.*), formed by a promontory, 820 feet above the sea, terminates in rocky cliffs, is surrounded by rocks, and commanded by high mountainous land. On the summit is the village of Taksebt, of some extent, and situated in the midst of cultivated land, and various houses are scattered about the slopes of the hills, which form an amphitheatre extending into the high land of Tizi bu Nuar, which, at about 5¼ miles from the cape, reaches an elevation of 3,087 feet above the sea. Mechguda, a mountain 2,772 feet high, about 4 miles south from the cape, has on it a group of trees conspicuous from the offing.

Taksebt. *Cap Tedles, bearing 265° true, distant 5 miles.* *Pointe de Dellys.*

Roches de Sidi Kraled.—From about one mile eastward of Cap Tedlés, a chain of rocks above water extends, in a north-easterly direction, for a distance of three-quarters of a mile, and forms a natural jetty, sheltering small craft from westerly winds; from the extreme of these rocks Cap Tedlés bears 272° true.

Coast. — Between Cap Tedlés and Ras Aït Rauna, a distance of 7 miles, the coast forms two bays, separated by a rocky promontory; Ras Timliliu, 5 miles from Cap Tedlés may be known by the two

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Chart 1910, Algiers to Cape Bougaroni. Var. 11° 10′ W.

rounded hills of Timliliu, 942 feet high, and in the bay between there are two mosques.

Ras Aït Rauna is backed by a hill 820 feet high, on which are the houses of the village of the same name; a rock, with 3½ fathoms water over it, is situated 4½ cables north-westward from the point, and another rock on which the depth is 6 feet lies southward of the preceding and 1½ cables from the shore.

Mersa Bleruna (Aït Rauna), eastward of Ras Aït Rauna, is about a mile deep and affords sheltered anchorage, from westerly winds, in 8 fathoms water, about half a mile from the shore; the shore is rocky and backed by two isolated hills 460 and 610 feet high, and to the southward may be seen Jebel Taurirt and Iril Mahani, 2,438 and 2,516 feet high, respectively.

Ras Mers el Farm, a slightly salient rocky point, is prolonged by a chain of rocks, uncovered, and extending 2 cables in a northerly direction, to the northward of which, and separated by a channel, in which the depths are from 5 to 7 fathoms, there is a bank of rocks 2½ cables in length east and west, and three-quarters of a cable in breadth. At one mile north-eastward of the point lies a rock awash, surrounded by depths of 16 fathoms. The *red* sector of Cap Corbelin light shows over this rock.

Port Gueydon or Azeffun.—The shore of Mers el Farm, extending 4 miles to the eastward of these rocks, is broken by slightly elevated cliffs, and bordered by rocks extending about 2 cables from the shore, and in its south-east angle is Port Gueydon or Azeffun, where there is a village, a boat slip and a jetty, off which anchorage may be obtained in from 4 to 5 fathoms water. The jetty is 98 yards long and has a depth of 26 feet at its outer end.

Light (*Lat. 36° 54′ N., Long. 4° 25′ E.*).—A *fixed white* light is exhibited, at an elevation of 22 feet above the sea, from a metal support, 20 feet in height, situated about 50 yards from the root of the jetty. For arc of visibility, *see* Light list.

Life-saving station.—A station, to afford assistance in the event of shipwreck is maintained at Port Gueydon.

Cap Corbelin, 13 miles eastward of Cap Tedlés, is high, of a red colour, and easily recognised by the inclined stratification on the rocks which compose it; a reef awash extends a cable from the cape.

To the southward of Cap Corbelin, distant half a mile, is Azeffun, 1,355 feet high; 1½ miles distant, Azeffun Jemane, 1,414 feet high; and 5½ southward the remarkable peak of Tamgut, 4,206 feet high,

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Chart 1910, Algiers to Cape Bougaroni. Var. 11° 10′ W.

visible from a long distance, and, having the same appearance in every direction, forming an excellent mark. *See* view on chart.

LIGHT (*Lat. 36° 55′ N., Long. 4° 26′ E.*).—On this cape is exhibited, at an elevation of 137 feet above the sea, a *white group occulting* light, showing groups of *two* eclipses *every eight seconds*, thus:—light *four and a half seconds;* eclipse, *one second;* light, *one and a half seconds;* eclipse, *one second.* It is exhibited from a white cylindrical tower, the centre of the lantern being 44 feet above the base of the tower, and is visible in clear weather from a distance of 14 miles.

This light shows *fixed red* from the bearing of 98° true to the coast westward of the cape.

Semaphore.—There is a semaphore on Cap Corbelin. Call letters A.K.Y.C., International code.

Coast.—The coast to the south-eastward of Cap Corbelin is high for a distance of 4 miles, when it becomes low and forms an indentation to the southward with a sandy beach interrupted by small cliffs. The land within is low and level, covered with briars and bushes; the beach is the termination of a valley which at a distance gives to the indentation the appearance of a deep bay.

South of the coast are the mountains, Bahrisen, 2,802 feet; Jemaa bu Ruma, 2,782 feet; Arrura, 3,563 feet, and Jemaa Guermu, 3,770 feet high, the two latter being 6 miles inland. Beyond the first range and about 26 miles inland, are the conical summits of the Gergerah chain, Lella Kudal, the highest, being 7,572 feet high.

Ras Ksila, 10 miles eastward of Cap Corbelin, is rocky, and may be known by two conical paps, named Ksila Jemma and Ksila, 853 and 1,129 feet high respectively. At 8 cables to the westward of the cape and 1¾ cables from the shore, there is a rock with 6 feet water over it, and half a mile to the eastward, and 1½ cables from the shore another rock, on which the depth is 10 feet. From Ras Ksila, where the sandy beach terminates, cliffs, with little interruption, continue as far as Cap Sigli.

Cap Sigli, 16 miles from Cap Corbelin, is of moderate height, and when seen from eastward or westward appears to project, but from the northward it is blended with the high land behind it. It may be known by its rocky summits resembling ruins, and 2 miles southward of it is Jebel Menju, 2,215 feet high.

LIGHT.—From a white cylindrical masonry tower, with dwelling attached, and 116 feet high, erected on this cape, is exhibited a *white flashing* light *every five seconds*, thus:—flash, *seven-tenths of a second;* eclipse, *four and three-tenths seconds.* It is elevated 185 feet

Chart 1910, Algiers to Cape Bougaroni. Var. 11° W.

above the sea, and is visible in clear weather from a distance of 19 miles.

Coast.—Eastward of Cap Sigli the coast is composed of cliffs; at nearly 1½ miles eastward from the extremity of the cape is a rugged islet 108 feet high, of a red colour, and several rocks.

The high land, forming Cap Sigli, terminates 2¼ miles south-south-eastward of it in a point surrounded by rocks, extending for a distance of 3 cables northward and north-eastward.

Anchorage may be obtained in 6½ fathoms water, in front of a large sandy beach, in the bay south-eastward of the point, but only temporary.

Coast. — From this anchorage the coast, generally rocky, is bordered by reefs extending from half to three-quarters of a cable from the shore for a distance of 6 miles, to Ras Timri N'Tguerfa; and the land rises to summits 2 or 3 miles inland, the most remarkable mountains being Ne dekka Adrar, and Adrar Tiramint, situated 1½ and 2 miles from the coast, and elevated respectively 1,982 and 2,628 feet above the sea; 6½ miles inland Jebel Arbalu reaches the height of 4,330 feet. *See* view on chart.

Rock. — A rock, about 10 yards in extent, and with a depth of 6 feet over it, is situated about 3½ cables from the coast, at 5 miles eastward of Cap Sigli; there are depths of 13 fathoms surrounding this rock.

Pointe des Moules (*Lat. 36° 50′ N., Long. 4° 57′ E.*), 2 miles south-eastward of Ras Timri N'Tguerfa is low, and nearly 4 cables north-eastward of it there is a small bank of coral, named Rocher des Moules, which uncovers. Ras Jerbah, 1¾ miles south-eastward of Pointe des Moules, has a bay on its western side, sheltered from easterly winds, and where landing may be easily effected; south-south-westward of this point are Jebel Ibustáen, 1,700 feet, and Tadrart, 1,825 feet high.

Plan of Pisan rocks on 1766.

Ile Pisan (Gerebia), rocky, and about 250 yards in length, is 108 feet above the sea, and situated half a mile north-eastward from Ras Jerbah; its sides are covered with some vegetation, and it is surrounded by several rocks. At nearly half a mile north-west of the island there is a rock always uncovered, and between the island and the shore the depths vary from 3¼ to 5 fathoms.

The *red* sector of Cap Carbon auxiliary fixed light shows over Ile Pisan and rocks.

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Chart 1910, Algiers to Cape Bougaroni. Var. 11° W.

Coast.—Pointe Mezaïa (Ras Selsoul), 1½ miles south-east of Ras Jerbah, is surmounted by a pap, 82 feet above the sea, which, from certain positions seaward, appears as an island; a small bay, southward of the point, which affords shelter from westerly winds, has two rocks in it.

Eastward of Pointe Mezaïa to Cap Carbon, for a distance of 4¾ miles, the coast forms vertical cliffs 330 to 650 feet above the sea, which are inaccessible; the only salient portion of this coast is situated about 4 cables westward of the cape.

GOLFE DE BOUGIE.—From Cap Carbon the coast turns to the southward, recedes westward, and again trends southward, eastward, and north-east to Cap Cavallo, thus forming the Golfe de Bougie, which is about 24 miles in breadth, 8 miles deep, and open to the northward. The western shore is composed of extensive sandy beaches with small rocky points, and the eastern is of cliffs with small beaches. The land near the sea is not high, but backed by steep, arid mountains, Adrar ne Fad being 5,725 feet high, with an apparently flattened summit when seen from easterly or westerly directions. The gulf is clear of danger, and the shore may be approached by the lead.

A strong current has been experienced setting into Golfe de Bougie round Cap Carbon.

Plan 1710, Bougie.

Cap Carbon, named by the Arabs Metsub, from its extremity being pierced, is 689 feet high, and the north-eastern extreme of a mass of bare rocky land, on the summit of which is Fort Guraïa, 2,175 feet above the sea. From the north-westward and opposite direction the cape appears like a sugar loaf, in consequence of the low land behind it. (*See* view on chart 1910.) The extreme portion of the cape is perforated in a northerly and southerly direction, through which passage boats sometimes pass in fine weather; there is deep water close to the cape.

LIGHTS (*Lat. 36° 47′ N., Long. 5° 6′ E.*).—On this cape is exhibited, at an elevation of 722 feet above the sea, a *white group flashing* light, showing groups of *three* flashes *every twenty seconds*, thus:—flash, *four-tenths of a second;* eclipse, *three and eight-tenths of a second;* flash, *four-tenths of a second;* eclipse, *three and eight-tenths of a second;* flash, *four-tenths of a second;* eclipse, *eleven and two-tenths of a second.* It is exhibited from a circular tower, 33 feet in height, surmounting a dwelling, and is visible from a distance of 33 miles in clear weather.

An auxiliary *fixed* light is exhibited, from a cylindrical tower, at an elevation of 105 feet above the sea, three-quarters of a cable north-eastward of the above light, showing *red* between the shore and the bearing of 125° true, and *white* in other directions. The *red* and

Plan 1710, Bougie. Var. 11° W.

white lights are visible from distances of 9 and 14 miles respectively in clear weather.

Signal station.—Semaphore.—A signal station and semaphore, connected by telegraph with Bougie and Algiers, is established at Cap Carbon; vessels can communicate by the International code of signals. Call letters A.K.Y.D.

Bougie approach. — Ras Buac. — From Cap Carbon the coast is composed of high, steep cliffs of a grey colour, and forms two points, Cap Noir, the first, 3½ cables south of the cape, being black, and Ras Buac, the second, about 6 cables southward, bluff, and a spur of Jebel Guraïa; about three-quarters of a mile farther on in a south-westerly direction are the point and fort of Abd-el-Kader.

LIGHT (*Lat. 36° 46′ N., Long. 5° 6′ E.*). — A *fixed white* light is shown at an elevation of 482 feet above the sea, from a dwelling, 15 feet in height, on Ras Buac. In clear weather it is visible from a distance of 7 miles.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave Port de Bougie are **earnestly requested** to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:—

By the arc of a circle drawn with Cap Carbon semaphore station as centre, with a radius of 2 miles, meeting the coast westward and southward of the cape.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

Port de Bougie consists of a jetty extending south-eastward from Ras Abd-el-Kader for a distance of 400 yards, and another one from Ras Kasba extending parallel to the former for a distance of about 500 yards, and then turning in a north-easterly direction for a further distance of about 500 yards. The entrance between the extremes of the jetties is about a cable wide. The works on the southern jetty are not yet completed.

Merchant vessels generally secure in the harbour with their sterns fast to the northern jetty and their heads south-westward.

Depths. — The depth in the entrance is 25 feet; in the harbour there is also a depth of 25 feet.

LIGHT.—A *fixed green* light is shown, at an elevation of 23 feet above the level of the sea, from a wooden shed 17 feet in height, about

General charts 1910, 1766, 2158a, 449.

Plan 1710, Bougie. Var. 11° W.

65 yards from the outer end of Abd-el-Kader jetty. In clear weather it is visible from a distance of 7 miles.

Light-buoy.—A red light-buoy, exhibiting a *fixed white* light, is moored at the extremity of the works on the western breakwater; vessels entering the port should pass between this light-buoy and the *green* light on the end of the eastern breakwater.

Pilots.—There are no pilots, but the Captain of the Port will act as pilot if desired.

Tugs.—Several tugs are available.

Anchorages (*Lat. 36° 45′ N., Long. 5° 5′ E.*).—The best anchorage is in Mersa Sidi Yaïa, between Ras Buac and the port in from 4½ to 6½ fathoms water, over mud, or mud fixed with sand in the lesser depth, at about 2 cables from the shore, and even north-easterly winds have little strength, and communication with the shore is never interrupted; the best berth is in the northern part of the bay, off, what was, the Harbour Master's Office. A buoy lies in about 5 fathoms of water, about 5 cables north-north-eastward of the extreme of Abd-el-Kader jetty. Sidi Yaïa marabut is not visible from seaward, but near its position there is a conspicuous chimney.

In Mersa Sidi Yaïa and the port heavy squalls and eddy winds descend through the ravines of Jebel Guraïa, during northerly gales.

Directions.—In clear weather the position of Bougie will be known from a distance of from 30 to 45 miles by Arbalu, an isolated mountain which lies 11 miles westward of the town, and attains an elevation of 4,330 feet above the sea; it is well rounded when seen from eastward or westward, but assumes a conical or angular appearance when seen from the northward. A chain of mountains, remarkable for rocky summits, varied forms, and elevations to the eastward, extends a considerable distance in that direction; Adrar ne Fad, with its flattened summit, being 5,725 feet high. (*See* view on chart 1910.)

On approaching Cap Carbon, Jebel Guraïa, with its fort about a mile west of the cape, will appear apparently isolated; the lighthouse on the summit of the cape, Ras Buac, and finally the low land at the head of the gulf, will be seen. By night the lights on Cap Carbon, Ras Buac, and Abd-el-Kadir jetty, will be sufficient guide.

Sailing vessels seeking refuge at Bougie in a north-westerly gale should not approach the coast between Cap Carbon and Ras Buac too closely, as a calm might be experienced under the high land, and they may be exposed to the sea and current; Mersa Sidi Yaïa may be approached with caution, as near as the wind will allow, and anchorage taken up in 8 or 10 fathoms water, shifting, if necessary, to a more convenient berth when the wind admits.

General charts 1910, 1766, 2158a, 449.

Plan 1710, Bougie. Var. 10° 50′ W.

It is difficult to work to windward on account of the strong, variable squalls and eddies. When the wind is N.W. in the offing, it is West or W.S.W. in the bay, which increases the difficulty of working to westward. In entering Mersa Sidi Yaïa with a fresh breeze from the northward, which is always accompanied with a heavy sea, pass Ras Buac as closely as possible.

Town (*Lat. 36° 45′ N., Long. 5° 5′ E.*). — The town of Bougie, containing 14,300 inhabitants, is built on the shore of the port, and on the southern slope of Jebel Guraïa. It occupies a part of the site of the ancient Roman town, and there are a considerable number of forts. The railway station is on the southern side of Ras Kasba.

Communication. — Direct steamship communication with Marseille and with Algiers twice every week; weekly with Jijelli, Collo, Philippeville, Bona, La Calle, Tabarka, Bizerta, and Tunis.

The railway from Bougie joins the East Algerian railway at Beni-Mancour junction; telegraphic communication with all parts. *See* also page 20.

Coal and supplies. — About 1,500 tons of Welsh coal and briquettes are kept in stock; and about 350 tons might be put on board in 24 hours. There are 14 lighters, but none kept loaded. There is a coal wharf, 300 feet in length, with 18 feet water alongside.

Supplies of fresh provisions are plentiful, and vegetables cheap; water, of excellent quality, is easily obtained from a fountain at the inner end of the mole, and there is a good watering place about 2 cables north-westward of Ras Buac.

Shipping. — In 1907, 1,842 vessels entered the port, having a total tonnage of 837,739 tons.

Life-saving station.—A rocket apparatus is maintained at the Custom-house, Bougie.

Chart 1910, Algiers to Cape Bougaroni.

Coast. — Southward of Bougie, for 3 miles, the coast is low and sandy, and here the Wadi Sommam (Sahel) enters the sea. Caution is necessary when navigating in the neighbourhood of this mouth, as, especially during the winter, dangerous banks are formed at a considerable distance from the shore; Dar Mohand, an isolated mountain, 1,007 feet high, is situated 1¾ miles southward of the mouth of the river.

From this the coast has an east-south-easterly direction for 8 miles to Ras Aokas, above which is Jebel Aokas, 1,542 feet high; several small streams enter the sea between Dar Mohand and Ras Aokas. A nearly straight beach then stretches eastward for 6 miles to Ardar Jemna N'Sia, a mountain 1,716 feet high, situated close to the coast.

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Chart 1910, Algiers to Cape Bougaroni. Var. 10° 40′ W.

Ras Aokas (cone).

All this part of the coast is clear of danger; here and there a few rocks extend short distances from the shore, but the depths are generally regular. Eastward of Adrar Jemna N'Sia, for 2 miles, the coast is a succession of high, rocky cliffs, and at 3 miles is Ras Ziama, with the conical hill, of the same name, 450 feet above the sea. The remarkable summit of Jebel Tababor, 6,460 feet high, 8½ miles south of Ras Ziama, is said to be visible, from seaward, about 90 miles. From the west point of the bay westward of Ras Ziama, some scattered rocks, with 9 feet water over them, lie 1½ cables from the coast.

Île Ronde, a small rock, a few yards in diameter and 3 feet above the sea, is surrounded by depths of from 20 to 25 fathoms, and lies half a mile northward of Ras Ziama.

Pointe Mansuria (*Lat. 36° 41′ N., Long. 5° 29′ E.*).—Between Ras Ziama and Pointe Mansuria, 2 miles eastward, the coast is rocky and, from the latter point, is prolonged by a group of rocks terminating in Îlot Mansuria, which is conical; the group extends about 3½ cables in a north-easterly and south-westerly direction, forms a breakwater, and affords anchorage, to the eastward of it, for small vessels, in from 10 to 13 feet water, completely sheltered from westerly winds.

A short distance, south-westward of Îlot Mansuria, a rocky flat, about 1½ cables in length in northerly and southerly direction, has 3 feet on its southern and 13 feet on its northern extremities; and a rock with 16 feet over it, lies about 3 cables north-eastward of the islet. One mile north-eastward of the islet there is a patch, with 7 fathoms water over it, about 2 cables in extent.

Southward of the island the land rises rapidly in the interior, and at 2 miles south-westward Jebel Merada is 2,030 feet high; and 1½ miles south-eastward Jebel Ibrak, 2,789 feet high; from this south-westward and south-eastward are other summits between 4,000 and 5,000 feet high, and between Jebel Merada and the coast, a hill named Jebel Messaia is 1,421 feet high.

Light.—On the extreme of Îlot Mansuria, from an iron column, 19 feet in height, at an elevation of 174 feet above the sea, is exhibited an unwatched *fixed green* light, visible in clear weather from a distance of 3 miles.

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Chart 1910, Algiers to Cape Bougaroni. Var. 10° 40′ W.

Coast.—From Îlot Mansuria the coast has a north-easterly direction, remains considerably elevated, and is broken by ravines and small sandy bays; at 2 miles from the island, small vessels find perfect shelter from winds between North and East, under Ras Jebel el Kern. From a small stream running into the sea excellent water may be obtained even in the dry season. A rock, with 3 feet water over it, lies three-quarters of a cable westward of the point, and 1½ miles south-eastward of the bay, Dar el Jebel rises to 1,581 feet above the sea.

Mersa Taza (*Lat. 36° 43′ N., Long. 5° 33′ E.*), one mile further eastward, is clear, but the anchorage is not good for a sailing vessel, owing to the difficulty in leaving, should bad weather set in; a shoal, with 5 feet water over it, lies 1¼ cables from the shore, and is surrounded by depths of 13 feet.

Jebel Taunnart, 2,546 feet high, 2 miles eastward of Mersa Taza, is isolated and remarkable from its summit, which slopes towards the northward and southward, and seen from the westward appears like a sharp pointed cone, and from the northward as a table. In the interior, to the south-eastward, and from 5 to 9 miles from the coast, are the mountains Jebel Korn, 3,684 feet; Jebel Hammera, 4,236 feet; and Msid Echta, 5,072 feet high.

Eastward of Mersa Taza there is a beach about a mile in length, after which the coast becomes high, and is bordered by rocky, inaccessible cliffs; at 2 miles north-eastward of Mersa Taza a small islet, 39 feet above the sea, lies close to the coast; there are several deep ravines, and rocks extend in places about a cable off-shore. All this region is covered with forests of cork trees. For 1¼ miles westward of Cap Cavallo the coast is bordered by rocks extending 2 cables from the shore, and there is one small beach accessible with East and N.E. winds.

Cap Cavallo is the extremity of a group of high conical hills, separated from one another by deep ravines, and covered with forests to their summits; the highest mountain is Jebel Sidi bel Hassem, 1,985 feet high. The point is from 150 to 200 feet above the sea, and several islets and rocks lie off it. There are iron mines southward of the point.

The outer islet, westward of the cape, named Hajret Tafalkut, is a rock of basalt, 56 feet above the sea, with deep water close to, except eastward of it, and is situated one mile from the point, and 2¾ cables from the shore; another islet, 36 feet above the sea, is situated to the eastward of the preceding and 2 cables from the shore.

Rocks.—An isolated rock, with 1½ fathoms water over it, which lies 3 cables north-eastward of Hajret Tafalkut, is the most outlying

General charts 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 10° 40′ W.

danger in this vicinity; about 4 cables westward of Cap Cavallo there is another rock with 4¾ fathoms water over it.

Ile du Grand Cavallo, situated half a mile eastward of the point, is 2½ cables in length, 171 feet above the sea, and covered with brushwood; shoal water, with depths of from 2 to 3¾ fathoms, extends 2½ cables northward of the island, and between it and the shore there are similar depths.

Île du Grand Cavallo, bearing 225° true, distant 3 miles. *Cap Cavallo.*

Anchorage, in summer, may be obtained in from 5½ to 6½ fathoms water between Cap Cavallo and Île du Grand Cavallo, but the nature of the bottom should be ascertained before anchoring.

Pointe du Petit Cavallo (*Lat. 36° 48′ N., Long. 5° 39′ E.*) is situated 3 miles eastward of Cap Cavallo, and between the coast is formed by a large beach, off which there are some patches of rock, covered and uncovered, and the Wadi Burchaïd, which flows from Jebel Korn, runs into the sea in the middle of the beach. The point, from 50 to 65 feet above the sea, is prolonged to the north-westward by a rocky flat, on which is Île du Petit Cavallo, flat, rocky, without vegetation, and surrounded by rocks and small islets.

Rocks.—At 3 cables south-westward of the islet there is an isolated rock with about one foot water over it, and 2 cables north-eastward of the islet a rock on which the depth is 3¼ fathoms, surrounded by 8 to 10 fathoms water.

Ras Afia, a steep projecting point 2 miles eastward of Pointe du Petit Cavallo, has off it a small islet of a red colour, and about a quarter of a mile to the north-east of the islet are three rocks awash, which should be carefully avoided. Between Petit Cavallo and Afia islets there is a beach extending one mile, then a point from 65 to 100 feet above the sea, followed by a small bay. The bottom along this part of the coast and around the islet is sand, rock, and coral.

Ras Afia lighthouse, bearing 66° true, distance 5¼ miles. *Petit Cavallo.* *Grand Cavallo.*

General charts 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 10° 40′ W.

LIGHTS (*Lat. 36° 49′ N., Long. 5° 41′ E.*).—On Ras Afia, an octagonal stone tower, 46 feet in height, with main building attached, exhibits, at an elevation of 138 feet above the sea, a *flashing red* light, *every four seconds*, showing a flash for *one and a half seconds*, followed by an eclipse of *two and a half seconds* duration. It is visible in clear weather from a distance of 18 miles.

An auxiliary *red fixed* light, visible over Salamander reef and Banc des Kabiles, is shown, at an elevation of 89 feet, from a building about 9 yards eastward of the main light, and is visible in clear weather from a distance of 10 miles.

Salamander reef.—This small rocky shoal, with 13 feet water over it and depths of from 25 to 30 fathoms around, lies with the lighthouse on Ras Afia bearing 145° true, distant about $2\frac{1}{10}$ miles.

Banc des Kabiles, another rocky shoal, triangular-shaped, with 6 to 7 fathoms water over it, and depths of from 22 to 27 fathoms around, is larger than Salamander reef, and lies $1\frac{1}{4}$ miles to the north-westward of it; during bad weather there is a heavy sea on these dangers.

Vessels navigating in this vicinity should either pass midway between Salamander reef and the coast, at about a mile from the latter, or northward of the dangers, 5 miles from the land. Jebel Seddets (*see* page 387) well open north of Jijelli lighthouse, bearing 105° true, leads to the northward of the two rocks; and the summit of Mes Ritan in line with Ras Afia lighthouse, bearing 124° true, leads to the south-westward of the two rocks.

At night, keeping outside the *red* sector of Jijelli light will lead to the northward or southward of the rocks, and keeping outside the *fixed red* sector of Ras Afia light will lead to the eastward.

Coast.—From Ras Afia eastward a line of reefs extends about a cable from the coast to Mersa el Kalaa, a distance of 2 miles; the bay has a small islet in its western part and affords shelter to small vessels from easterly winds, but the bottom is rocky in places.

Jebel Mes Ritan, 1,293 feet high, lies one mile southward of this

Jebel Mes Ritan. *Town.* *Jijelli lighthouse, bearing 270° true, distant 8 miles.*

General charts 1766, 2158a, 449.

Plan of Jijelli on 178. Var. 10° 40′ W.

coast; its isolation and a white building on its summit render it a good mark when making Jijelli.

JIJELLI. — About 2 miles eastward of Mersa el Kalaa is a small rocky peninsula, on which are warehouses on the site of the old town of Jijelli, surrounded by the citadel walls; the peninsula is joined to the mainland by a sandy neck, and a small cove, with depths of from 8 to 10 feet, lies on its western side. From the eastern side of the peninsula shoal water extends in an easterly direction for a distance of about 6 cables.

Breakwater. — A breakwater extends from the eastern side of the peninsula, eastward for a distance of 800 yards.

LIGHT (*Lat. 36° 50′ N., Long. 5° 47′ E.*). — A square tower 37 feet in height, and surmounting a dwelling, stands at the end of the breakwater, and exhibits, at an elevation of 61 feet above the sea, a *fixed white* light with a *red* sector of 5°, which is visible in clear weather from a distance of 11 miles. The sector of 5° shows over Salamander reef and Banc des Kabiles.

Depths. — The depth in the anchorage is 6 to 8 fathoms; in the boat harbour 3 to 7 feet.

Boat harbour. — From the south-east side of the peninsula a mole extends, in a south-easterly direction, for a distance of 225 yards, and from the shore westward another mole runs out nearly at right angles to the preceding for 143 yards, forming a small sheltered boat harbour about 6 acres in extent, with depths of from 3 to 7 feet, and only suitable for small vessels; the entrance is 140 yards in width, and the shorter mole, named Traverse du Commerce, is used for shipping cargoes.

Harbour lights. — Two small *fixed* lights are exhibited at the entrance to the boat harbour, *red* on the western side, *green* on the eastern side.

Dangers. — A rock, with 3¼ fathoms over it, lies 1¾ cables eastward of the breakwater lighthouse, and another with 4 fathoms lies the same distance northward of the lighthouse; as before mentioned, there is shoal water between these rocks and the lighthouse.

Buoy. — A mooring buoy, belonging to the Compagnie Générale Transatlantique, lies about 2 cables eastward of the entrance to the boat harbour.

Pilots. — There are no pilots, but the Harbour master will point out the anchorage.

General charts 1766, 2158a, 449.

Plan of Jijelli on 178. Var. 10° 40′ W.

Anchorage. — The anchorage, in summer, is in from 7 to 8 fathoms water, eastward of the centre of the town, with the breakwater lighthouse bearing 11° true; in winter anchorage should be taken up further south in the bay, in depths of 7 to 8 fathoms, with Fort Duquesne bearing about 270° true and the lighthouse 0° true. The holding ground is good.

Town (*Lat. 36° 50′ N., Long. 5° 47′ E.*). — A beach stretches for about a third of a mile to the southward of the boat harbour, with rocks and shallow water over weeds, and a small black rock lies about midway and half a cable from the shore; Fort Duquesne, on a large rock, is on the south extreme. The new town, built parallel to this beach, has a population of about 7,500, and is extending. Supplies are scarce.

Communication. — There is weekly communication by steam vessels with Bougie, Algiers, Marseille, Collo, Philippeville, Bona, La Calle, Tabarka, Bizerta, and Tunis.

Life-saving station. — A rocket apparatus is maintained at Jijelli.

Chart 1910, Algiers to Cape Bougaroni.

Coast. — Eastward of Jijelli a vast elevated plain, sloping slightly towards the interior, and bordered by a beach, 20 miles in length, extends, in an easterly direction, to Montagnes de Tahard. The depths are regular along this coast, 5½ fathoms being found at about 4 cables from the shore, and 11 fathoms at twice that distance.

A small rocky point, off which there is a round islet named Tazerut, 42 feet high, is situated 4 miles from the end of the beach. Several small streams run through this beach, the principal being Wadi Nil, which has a wood near its mouth, and the Wadi el Kebir, which receives the waters of the Rummel, which flows through Constantine.

There are several remarkable summits in the interior a little distant from the coast; Jebel bu Kertzum, one mile inland, is 492 feet, and about half a mile eastward of this is a house, clearly seen from seaward; El Cudiat, a similar distance from the coast, is 377 feet; and further eastward, Jebel Seddets and Chuf Ali are 3,153 and 1,800 feet high respectively. Jebel Seddets is conspicuous from its isolation, and seen from the westward, over Jijelli, appears as part of Cap Bougaroni, an error which should be guarded against in running along the land to the eastward, in foggy weather.

Montagnes de Tahard are two mountains situated 1½ miles eastward of the mouth of the Wadi el Kebir, the northern one, 1,135 feet high, lies near the coast, and the southern one, 1,510 feet high, lies about 1½ miles inland; the rocky coast here is clear of

General charts 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 10° 30′ W.

danger, and terminates, to the eastward, in a small peninsula formed by a conical rock, 82 feet above the sea.

On the western side of the peninsula is a small creek where landing may be effected, and the only outlying rock on this part of the coast is situated one mile eastward from the peninsula and 1½ cables from the shore; the coast here is a sandy beach, stretching 3 miles in an easterly direction to the mouth of the Wadi Zurh, from which the coast again changes, and a succession of cliffs and elevated land take the place of the sand.

A rock, on which the depth is 13 feet, lies 2¼ cables north-westward from the mouth of the Wadi Zurh.

Mersa Zeitun (*Lat. 36° 57′ N., Long. 6° 16′ E.*).—At 1½ miles north-eastward of the Wadi Zurh the coast turns to the northward, forming a bay, bordered by a sandy beach two-thirds of a mile in length, divided by a little rocky point off which there is a large islet with two conical summits; the little bay north of the islet is named Mersa Zeitun, and affords sheltered anchorage from easterly winds to small vessels, but there are some rocks to be avoided; the land rises rapidly behind the bay, and at 3 or 4 cables north of it a cascade falls into the sea.

Anse de Casabianca.—One mile northward of Mersa Zeitun the direction of the coast changes to west-north-westward, and forms the little bay of Casabianca, which is the end of a large rocky ravine.

Light. — A *fixed white* light is shown, at an elevation of 37 feet above the sea, from a lantern, 5 feet above the ground, and situated near the western face of a small white house on the beach at Casabianca; it is visible in clear weather from a distance of 4 miles.

Anchorage. — There is good anchorage in this bay with winds from North to East, in from 8 to 11 fathoms water, about 4 cables from the shore, or closer in 5½ to 6½ fathoms, over sand, with more shelter, in front of a house with a red roof standing near the sea, but the anchorage, being completely exposed to westerly winds, should be left on any indication of the winds shifting to that quarter.

Water. — Fresh water may be obtained from a cascade, which does not dry in summer.

Coast. — From the west point of Anse de Casabianca, the coast turns to the northward for about 1¼ miles, and is formed of rocky cliffs. Îlot Lamein, situated 1¼ cables off the northern part of this coast, is about a quarter of a cable in diameter, 10 feet above

General charts 1766, 2158a, 449.

Chart 1910, Algiers to Cape Bougaroni. Var. 10° 20′ W.

the sea, and forms a good mark; there is deep water close westward of the islet, but a rock awash lies between it and the mainland.

Ras Atia, a point 2½ miles north-eastward of Îlot Lamein, has several rocks, uncovered, lying near the shore, along the foot of the cliffs.

LIGHT (*Lat. 37° 1′ N., Long. 6° 16′ E.*).—From a white square structure erected on this cape is exhibited, at an elevation of 177 feet above the sea, a *fixed red* light, which is visible from a distance of 6 miles in clear weather.

Coast.—Two miles eastward of Ras Atia, at the end of a remarkable ravine, is a small creek named Mersa Damus; the stream of the same name runs into the creek. Ras el Kmaken, another salient point, 2¼ miles north-eastward of Mersa Damus, terminates in a small rocky peninsula, 72 feet above the sea.

Ras el Karne is 3 miles eastward of Ras el Kmaken, and between are two sandy bays; nearly midway between these points a rock about 60 yards in extent, surrounded by depths of about 20 fathoms, and with 20 feet water over it, lies 6½ cables from the shore, and about 1½ miles north-eastward from Ras el Kmaken. Cap Bougaroni lighthouse open north of the rocks off Pointe des Roches noir, bearing 95° true, leads to the northward of this rock.

Currents. — During the search made for the above rock, by the French vessel-of-war *Actif*, the currents were observed to set strongly in the vicinity of Cape Bougaroni, and over the rock they attained a velocity of 4 knots. The direction of the currents depends upon the prevailing winds, but easterly currents are more frequent than westerly currents.

Pointe des Roches noir, so named on account of the uncovered rocks which extend 1½ cables northward of it, is about two-thirds of a mile eastward of Ras el Karne, and between is a bay with several rocks, but affording sheltered landing; on the eastern side of Pointe des Roches noir there is a small sandy beach, and the coast thence trends eastward for 2¾ miles to Cap Bougaroni.

Chart 252, Cape Bougaroni to Fratelli rocks, &c.

CAP BOUGARONI, the northernmost point of the coast of Algeria, is known to the Arabs as Ras Seba Rous, or the seven capes. The coast composing this remarkable headland may be said to extend from Îlot Lamein on the west, round to Collo on the east, and forms throughout a high steep coast rising to a mass of rugged eminences; Jebel Gufi, the highest, and about 7 miles inland, attains an elevation of 3,891 feet above the sea. The highest peak seen from the westward is Jebel Gulin, 3,205 feet high.

General charts 1766, 2158a, 449.

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 10° 10′ W.

Cap Bougaroni, bearing 90° true, distant 18 miles. *Jebel Gulin.*

LIGHT (*Lat. 37° 5′ N., Long. 6° 28′ E.*).—On Ras Sidi bu Burnous, the northern extreme of Cap Bougaroni, from a white tower, 37 feet high, and attached to a white dwelling, is exhibited a *white group flashing* light, showing groups of *two* flashes *every ten seconds*, thus:—flash, *four-tenths of a second;* eclipse, *two and three-tenths seconds;* flash, *four-tenths of a second;* eclipse, *six and nine-tenths seconds.* This light is elevated 297 feet above the sea, and is visible from a distance of 24 miles in clear weather.

Signal station.—Semaphore.—There is a semaphore near the lighthouse with which vessels can communicate; letters A K X V, of the International code, are the distinctive signal.

Coast.—From Cap Bougaroni the coast, still high, trends to the south-eastward and at 3 miles from the point forms a bay, named Tamanart, open to the north-eastward, and terminates at Ras el Kebir, which consists of two points, having rocks, with depths of 10 feet, lying three-quarters of a cable off them.

Anchorages.—Mersa Tamanart affords good anchorage, with westerly winds, in 8 fathoms water, about 3 cables from the shore.

Beni Said, southward of Ras el Kebir, also affords good anchorage, but there is a rocky flat, with about 2 feet water over it, lying 3½ cables from the head of the bay. Ras Sidi Yahia, 896 feet above the sea, and surmounted by a white marabut tower, forms the south side of this anchorage, and 4 cables northward of this point a rock, surrounded by depths of 8 fathoms, has 4 feet water on its outer, and 10 to 13 feet on its inner extreme; 1¼ miles south-westward of the point the sugar-loaf peak of Sidi Achur is 1,778 feet high.

Temporary anchorage in 11 fathoms water may also be obtained in Baie des Jeunes Filles, the small bay between Ras Sidi Yahia and Jerba; it has a sandy beach through which a small stream runs into the sea.

Plan of Collo anchorage on 178.

Baie de Collo, lying between El Jerba peninsula and Ras Frao, is one of the best temporary anchorages on the Algerian coast. El Jerba peninsula has three summits from 330 to 427 feet above the sea, and is joined to the coast by a low isthmus, on which is the

Plan of Collo anchorage on 178. Var. 10° W.

town of Collo. Southward of the town the coast is high and rocky for three-quarters of a mile, followed by a sandy beach, 3 miles in length, at the end of which the Wadi Guebli runs into the sea.

About 3 cables westward of Cap Sénéda, the southern extreme of the roadstead, is a conspicuous white square tower on a hill 363 feet high. Nearly in the middle of the sandy beach is a lake, which was formerly the port of Jerba, but is now separated from the sea by a strip of sand half a cable in breadth. A depth of 12 fathoms is said to be still found in parts of the lake. Jebel Telezza, 627 feet high, lies 1½ miles southward of the lake.

LIGHTS (*Lat. 37° 1′ N., Long. 6° 35′ E.*). — On Ras Jerba, a white octagonal tower, 37 feet in height, with main building attached, exhibits, at an elevation of 91 feet above the sea, an alternating *fixed* and *flashing white* and *green* light *every two minutes*, which shows *fixed white* for *one minute fifty-three seconds*, and *flashing green* for *seven seconds*. It is visible in clear weather from a distance of 11 miles.

A *fixed red* light is shown, at an elevation of 33 feet above the sea, from a white light box, 10 feet in height, situated on the south point of the port; it is visible in clear weather from a distance of 4 miles.

Anchorage.—The best anchorage is from 1½ to 2 cables south-east of the town, in depths of from 10 to 11 fathoms, sheltered from winds between West and N.N.E.; an outer anchorage is in 19 or 20 fathoms water, over sand and weed, with the end of the mole bearing about 280° true.

Landing.—Boats can land on the beach, or at a small mole on the north-east side of the port.

Town. — Collo and its suburbs has a population of 3,500, and a considerable export trade in cork wood.

Communication. — Collo has weekly communication by steamers with Jijelli, Bougie, Algiers, Marseille, Philippeville, Bona, La Calle, Tabarka, Bizerta, and Tunis.

Shipping. — In 1910 this port was entered by 9 steam vessels, having a total tonnage of 15,249 tons, and 5 sailing vessels, with a total tonnage of 613 tons.

Water may be obtained from a fountain near the landing place.

Life-saving station. — A station, to afford assistance in the event of shipwreck, is maintained at Collo.

General charts 2158a, 449.

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 10° W.

Ras Frao, the east point of Baie de Collo, is rocky, quoin-shaped, and at its highest point 460 feet above the sea; eastward, a distance of 3 miles, to Ras Erded, the coast is high, with steep cliffs, broken here and there by ravines, through which run mountain torrents. Jezirat el Mta, one mile eastward of Ras Erded and half a mile from the coast, is 203 feet high, with a rounded summit of a reddish colour; blending with the rocky coast, it is not easily distinguished until close to; coasting vessels find shelter on its south side.

The rocky cliffs southward of Jezirat el Mta are followed by a sandy beach, and the coast turns to the north-eastward and northward to Ras Bibi, a rocky peninsula, bordered on all sides by inaccessible cliffs, and having two rounded hills on its summit, the northern 535 feet high; two large rocks lie a short distance north-eastward and north-westward of this point, and half a mile westward is Jezirat Bibi, 148 feet high.

Anchorage.—Good anchorage may be obtained on either side of Ras Bibi.

Pointe des Sept isles, so named from seven islets, extending for a distance of 3 cables northward of it, is 1½ miles eastward of Ras Bibi, the coast between being a sandy beach.

Ras Esra (*Lat. 36° 58′ N., Long. 6° 51′ E.*), 3 miles further eastward, is the extreme of a chain of mountains, of which Jebel Esra, 3½ miles south-westward, is the highest summit, 1,755 feet above the sea; the point is composed of rocky cliffs, and has off it two large sugar-loaf islets and several rocks, and Jezirat Boudief, 66 feet high, lies one mile westward of the point and close to the coast.

Jezirat Esra, the outer of two rocks, is 144 feet high, but not easily distinguished, except from the north-westward or eastward; it lies about one cable north-east of the point, the channel between having some rocks in it. A shoal, with 16 feet water over it, surrounded by depths of 16 fathoms, lies 1½ cables northward of the islet.

Mersa Akmes, eastward of Ras Esra, has a clean sandy beach, and affords good anchorage during summer, with westerly winds, in from 11 to 16 fathoms water, over sand, but the anchorage at Stora is preferable; two small streams run into the bay. At the end of the beach there are high cliffs terminating in Ras Akmes, which has an islet and several rocks near it.

Golfe de Stora.—The coast between Ras Akmes and Cap de Fer, 16 miles north-eastward of it, makes a deep bend which is named the Golfe de Stora. The shore is composed of sandy beaches, with

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 10° W.
rocky cliffs and an islet or rock here and there near the land. It is exposed to winds from the north-westward.
Plan of Stora and Philippeville anchorages on 178.

Jezirat Srigina, about 3 cables north-eastward of Ras Akmes, is 2 cables in length in a northerly and southerly direction, and surrounded by rocks, between which and those at the foot of Ras Akmes, the channel is about 1½ cables wide, with 10 fathoms water; the landing place is on the south side of the island. Philippeville breakwater *occulting* light shows *red* over Jezirat Srigina and the rocks off it.

LIGHT.—From a square tower, 36 feet in height, with a dwelling attached to it, erected on this island, is exhibited a *red flashing* light *every five seconds*, thus:—flash, *eight-tenths of a second;* eclipse, *four and two-tenths seconds;* it is elevated 184 feet above the sea, and visible from a distance of 18 miles in clear weather.

Îlot du Lion.—From Ras Akmes the rocky coast trends southward for 8 cables to Cap Est, and at a mile southward of Srigina lighthouse, and about a cable from the shore, is Îlot du Lion, somewhat conical in form and 98 feet high. On the eastern side of the islet, about three-quarters of a cable distant, is a rock a little above water, called Lionceau. In the channel between the islet and shore there is a depth of 5½ fathoms, but a reef lies nearly midway, and a rock having a depth of 5 feet over it is situated about 70 yards from the western side of Îlot du Lion. Four cables southward of Cap Est is Roche du Lazaret, a rock awash, situated about a cable from the shore. The *green* sector of Îlot des Singes *fixed* light, and the *occulting red* light on Philippeville breakwater, shows over all these rocks.

BAIE DE STORA.—Îlot des Singes, or Monkey island, nearly covered by a battery, is situated one mile south-south-westward of Îlot du Lion; it is rocky, nearly united to the shore, and forms the north-eastern extreme of Baie de Stora, about 4 cables wide and 2 deep. The south point of the bay is rocky, and from it extend several rocks named La Marne. This bay, which was formerly much frequented, has, since the building of Philippeville harbour, lost its interest.

The village of Stora, backed by high land, is situated on the sandy beach westward of Îlot des Singes. *See* view on page 396.

Jetty.—A small jetty, about 60 yards in length, extends from the north side of the bay, about 1½ cables westward of Îlot des Singes.

LIGHTS (*Lat. 36° 54′ N., Long. 6° 53′ E.*). — On Îlot des Singes a *fixed white* light, with a *green* sector, is shown at an elevation of 55 feet above the sea, from a masonry tower 37 feet in height, situated in the battery; the *white* light is visible in clear weather from a distance of 10 miles, and *green* 5 miles.

For sector, *see* Light list and plan.

General charts 252, 2158a, 449.

Plan of Stora and Philippeville anchorages on 178. Var. 10° W.

A *fixed red* light is shown at an elevation of 24 feet above the sea, from a building near the jetty head.

Life-saving station. — A station, to afford assistance in the event of shipwreck, is maintained at Stora.

Anchorage.—In summer large vessels anchor from 2 to 3 cables south-eastward of Îlot des Singes, in depths of from 9 to 10 fathoms, but in winter it is necessary to anchor about 6 cables eastward, in depths of from 15 to 16 fathoms over muddy sand and good holding ground. Although the north-east and on-shore gales in winter are deadened by the high land of the gulf, a considerable swell sets into the bay from these quarters; winds from the north-westward occasionally blow hard, and also send in a heavy sea. When there are signs of bad weather or of northerly or easterly winds, vessels should at once seek shelter in Port de Philippeville.

Sailing vessels anchoring in this bay should be prepared with good anchors and cables, as should it come on to blow from the northward and eastward, and being unable to reach Philippeville, there is little chance of their getting out to sea, and many have been driven on shore.

Philippeville approach. — Submarine vessels. — For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port de Philippeville are **earnestly requested** to make use of the fairway defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:—

By the arc of a circle drawn with Jezirat Srigina lighthouse as centre, with a radius of 4 miles, meeting the coast westward and southward of the lighthouse.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

Coast. — At 2 miles south-eastward of Îlot des Singes is Ras Skikda, rugged and surrounded by rocks; it is the termination of a mass of rocky land, nearly isolated, and 520 feet above the sea, and the western slope of which is the town of Philippeville. The coast, between Stora and Ras Skikda, is a rocky cliff bordered by a sandy beach, off which are several scattered rocks; a battery midway is near the mouth of a stream named Wadi Kantara. At 2 cables from the shore there are from 6 to 8 fathoms water, over sand and weed, and at one mile about 18 fathoms.

General charts 252, 2158a, 449.

Plan of Stora and Philippeville anchorages on 178. Var. 10° W.

PORT DE PHILIPPEVILLE.—The artificial harbour at Philippeville is formed by a breakwater, Grande Jetée, which extends in a north-westerly direction from Ras Skikda, a distance of 1,750 yards, and a breakwater, Jetée du Chateau Vert, which extends from Pointe du Chateau Vert in a north-easterly direction, a distance of 460 yards. About 3 cables eastward of this, a jetty named Traverse du Sud, runs out for about 100 yards, nearly parallel to the preceding. On the north side short spurs extend from Grande Jetée, towards the ends of these jetties, leaving outer and inner entrances about half a cable in width.

Vessels can lie alongside the quays, provided they draw less than 18 feet.

A bank of sand, extending from the shore, narrows l'Avant-port, which has an area of 74 acres. A sandbank which nearly dries has formed within the first elbow of Jetée du Chateau Vert. The inner port, La Darse, has an area of 50 acres. There is a quayage space of about 1,200 yards, and the railway is connected with all the quays except those on the northern breakwater. The depths alongside the railway quay are 20 feet for about 1,100 yards, and eastward of Traverse du Sud there is a depth of 24 feet for a distance of 150 yards. La Darse has been dredged to a least depth of 23 feet, but less within 16 feet of the quays, so vessels drawing over 18 feet must be careful not to get too close to the quays.

Depths. — In the entrance to l'Avant-port there is a depth of 6 to 7 fathoms; in l'Avant-port there is from 6 feet to 9 fathoms. In the entrance to La Darse there is a depth of 5½ fathoms, and in La Darse a least depth of 23 feet, but only up to within 16 feet of the quays.

LIGHTS.—Grande Jetée (*Lat. 36° 53′ N., Long. 6° 54′ E.*). —An unwatched *group occulting* light, with *white* and *red* sectors, showing a *group of two* occultations, thus:—The light between the groups of eclipses may vary between *ten* and *fifteen seconds*, but the duration of light in each group of eclipses will always be one-third of the duration of light between groups. It is exhibited in a masonry tower, 45 feet high, at an elevation of 69 feet above the sea, from the outer end of Grande Jetée, and is visible in clear weather, the *white* light from a distance of 11 miles and the *red* light 6 miles. For arc of visibility, *see* Light list and plan.

Avant-port.—An unwatched *fixed red* light is exhibited in a round metal tower, 27 feet high, at an elevation of 33 feet above the sea, from the end of the jetty, at the northern entrance to l'Avant-port; it is visible from a distance of 4 miles; and an unwatched *fixed*

General charts 252, 2158a, 449.

Plan of Stora and Philippeville anchorages on 178. Var. 10° W.

green light is exhibited in a round metal tower, 27 feet high, at an elevation of 34 feet above the sea, from the northern end of Jetée du Chateau Vert; it is visible from a distance of 3 miles. For arcs of visibility of both these lights, *see* Light list.

La Darse.—A *fixed red* light is exhibited from the northern, and a *fixed green* light from the southern transverse moles at the entrance of La Darse.

Mooring buoys.—There are two berths for war vessels of not more than 470 feet in length in l'Avant-port, between mooring buoys marked D and D[1] and E and E[1]. There are also three berths for war vessels of not more than 470 feet in length in La Darse, with their heads secured to mooring buoys and sterns to the jetty.

There are 6 berths for torpedo-boats in the north-west angle of La Darse.

Pilots go outside day and night, weather permitting; vessels are not obliged to take one, but pilotage must be paid.

Anchorage (*Lat. 36° 53′ N., Long. 6° 54′ E.*).—The anchorage outside the breakwater should only be frequented in summer.

Directions.—After Cap Bougaroni or Cap de Fer has been made, Philippeville will be easily recognised. A small house with turrets and the chimney of a manufactory, both situated southward of Pointe du Chateau Vert, are conspicuous objects.

Philippeville, bearing 258° true, distant 9 miles. *Stora.*

Large vessels are cautioned not to shave the ends of the moles when working through the harbours, as they project some way under water.

At night.—Approaching Philippeville by night a vessel should make Jezirat Srigina light, and by keeping in the *occulting white* light from Grande Jetée, Philippeville, and in the *fixed white* light from Îlot des Singes, will be clear of all dangers on the western coast.

Town.—The town of Philippeville, fortified and surrounded by walls, contains churches and mosques, hospital, barracks, &c., and had a population in 1910 of 26,050. A British Vice-Consul is resident.

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Plan of Stora and Philippeville anchorages on 178. Var. 10° W.

The health office is under the lighthouse on Traverse du Sud.

Constantine, the capital of the province, of which Philippeville is the nearest and chief seaport, lies about 33 miles south-westward from it, and is the centre of a great agricultural district.

Communication. — There is communication by steamers with Marseille four times every week; and weekly with Collo, Jijelli, Bougie Algiers, Bona, La Calle, Tabarka, Bizerta, and Tunis. Railway communication with Constantine, thence joining the East Algerian railway at Khroub junction; telegraphic communication with all parts. The telegraph office is open till midnight.

Coal. — About 500 tons of coal and patent fuel is kept in stock by the Government and 3,000 tons by private firms. Coaling is done by lighters, of which there are 10 holding 50 to 100 tons, in the outer port, and 400 tons can be put on board in 24 hours. There is a coal wharf 650 feet long, with depths of 21 to 23 feet alongside. The coal depôt for French vessels of war is situated on the northern transverse mole at the entrance to La Darse.

Supplies. — Fresh provisions are fairly abundant, but 24 hours' notice is wanted for any considerable quantity. Good water may be obtained from cocks on the quays, at the price of about one franc a ton; it is supplied free to war vessels, who have, however, to supply their own hoses.

Repairs. — Small repairs to machinery might be executed at the railway workshops. There are 4 steam cranes on the southern quays and 2 floating cranes, one of 50 tons and the other 12 tons.

Life-saving station. — A lifeboat and rocket apparatus is maintained at this port.

Trade. — The principal exports are wheat, barley, wine, and sheep; and imports, alcohol, wine, coal, building materials, wood, and petrol.

Shipping. — In 1910, 912 steam vessels, with a total tonnage of 731,748 tons, entered the port, and 251 sailing vessels, with a total tonnage of 7,760 tons.

Chart 252, Cape Bougaroni to Fratelli rocks, &c.

Coast.—The Wadi Safsaf or Beni-Melki runs into the sea through the sandy beach about a mile to the eastward of Ras Skikda. The beach continues to the eastward for 6 miles to the commencement of Ras Felfela, and is all along backed by downs partly covered with vegetation.

Ras Felfela (*Lat. 36° 55′ N., Long. 7° 6′ E.*), a mass of rocky cliffs nearly vertical, surmounted by Jebel Felfela, 1,930 feet high, is

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Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 10° W.

9 miles eastward of Philippeville, and, having low land with sandy beaches on each side of it, appears at a distance isolated.

The most salient part forming the cape is about 2 miles in length in an easterly and westerly direction, terminating to the eastward in a sugar-loaf shaped rock, 115 feet above the sea; there are quarries of fine marble in the vicinity of Ras Felfela.

Coast.—From Ras Felfela the coast turns to the south-eastward for a mile to a little creek, with the houses of the hamlet named Saint Louis du Felfela, and a small jetty, where marble is shipped.

The coast is rocky, and broken by two or three small sandy beaches, for 2 miles eastward of the above creek, and then turning to the north-eastward is a sandy beach, 8 miles in length; some ruins are near the commencement of this beach, and 1⅔ miles north-eastward of them, and 4 cables from the shore, there is a rock with 3 fathoms water over it, surrounded by depths of 7 fathoms, and between this and the ruins other rocks extend nearly half a mile from the shore.

At 7 miles north-eastward of the ruins the Wadi el Kebir enters the sea, and here may be seen the large plain through which it flows, with numerous native villages in all directions. Jebel Sidi Messaud, 945 feet high, is the highest point near the coast, from which it is distant 5 miles.

Ras Sidi bu Meruane (El Mersa), 1½ miles northward of the mouth of the Wadi el Kebir, is surmounted by a marabut tower, and several rocks lie off the point and afford shelter to El Mersa beach, on which fishermen haul up their boats, and where there is a small village.

LIGHT (*Lat. 37° 2′ N., Long. 7° 15′ E.*). — On the extremity of the point, near the beach, a *fixed white* light is shown, at an elevation of 20 feet above the sea, from the west front of a small masonry house, 4 feet in height, which is back-to-back with the tower. It is visible in clear weather from a distance of 10 miles.

Coast.—Between Ras Sidi bu Meruane and Cap de Fer the coast is high and steep, and immediately to the southward of the cape there are two small creeks, separated by a rocky point, and affording sheltered anchorage to small vessels.

Cap de Fer (the Ras el Hadid of the Arabs), the eastern extremity of the Golfe de Stora, is the termination of a mass of black rocky, rugged land, destitute of vegetation and projecting to the north-westward. At the extremity of the cape is a conical hill about 1,148 feet high, and the land immediately eastward of it rises 1,585 feet above the sea.

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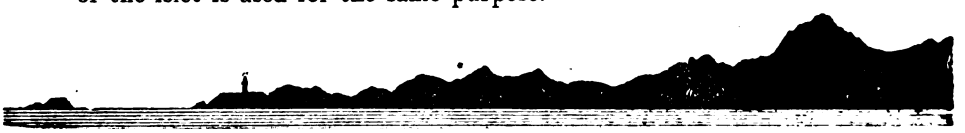
Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 50′ W.

LIGHT (*Lat. 37° 5′ N., Long. 7° 10′ E.*).—From a cylindrical stone tower, 58 feet in height, erected near the west point of this cape, is exhibited a *white group flashing* light, showing groups of *three* flashes *every fifteen seconds*, thus: — flash, *four-tenths of a second;* eclipse, *two and eight-tenths seconds;* flash, *four-tenths of a second;* eclipse, *two and eight-tenths seconds;* flash, *four-tenths of a second;* eclipse, *eight and two-tenths of a second.* This light is elevated 228 feet above the sea, and is visible from a distance of 21 miles in clear weather.

Semaphore.—There is a semaphore station on Cap de Fer, on the next hill eastward of the lighthouse, with which vessels can communicate; it is addressed by the letters A K X J of the International code.

Îlot de Fer, lying 4 cables off the western extremity of the cape, is about a cable in diameter, 115 feet high, with rocks off the south-western end. There are also several rocks in the vicinity of the cape, above water, and steep-to. In the channel between the islet and the cape there are from 6½ to 8 fathoms water. Small vessels using this channel should pass about one cable inside the islet. Between Îlot de Fer and the north extreme of Cap de Fer is a bay open to the northward, with a small beach, frequented in summer by the coral fishermen for water and provisions. Another small bay southward of the islet is used for the same purpose.



Îlot de Fer. *Cap de Fer lighthouse, bearing 10° true, distant 8 miles.*

Caution.—In winter the currents are very strong in these parts, and the swell from the north-westward, even with only a little wind, is very big, so vessels should not approach the cape or island too closely.

Anchorage.—With easterly winds, the best anchorage in the bay southward of the cape, is southward of the peak, at a mile or less from the shore, in from 16 to 18 fathoms. In this position a sailing vessel is in the best berth for getting under way in the event of the wind shifting on shore, when no time should be lost in leaving the anchorage. The bottom is mud, shells, coral, rock, and here and there sand and gravel. Coasting vessels anchor in a corner at the north end of the beach.

Directions.—A sailing vessel bound into Golfe de Stora with easterly winds should give a wide berth to Cap de Fer as already

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 50′ W.

cautioned. During summer in Baie de Collo and Golfe de Stora it is frequently calm, whilst the wind may be blowing in the offing; in winter northerly winds are common; therefore vessels should pass well to the northward of Capes Bougaroni and De Fer. From the westward Cap de Fer appears like an island, the land on its south side being low. The islet off, and the peak or conical hill over the west extreme of the cape, also assist in recognising it.

Mersa Sidi-Akeche. — At 5 miles eastward of Cap de Fer is Mersa Sidi-Akeche, with a sandy beach, where coasting vessels find shelter from easterly winds. A white marabut tower stands on the slope of the eastern point of the bay, and at another point farther eastward several rocks, some uncovered, extend nearly half a mile from the shore; at their east extreme is Jezirat Akeche, 60 feet above the sea.

Rocks.—On the western side of the bay, and about $1\frac{7}{10}$ miles eastward of Jezirat Akeche, is a rock with 10 feet over it, and about half a mile north-westward of the above is another with $3\frac{1}{4}$ fathoms over it.

Jezirat Tukush (*Lat. 37° 5′ N., Long. 7° 22′ E.*), $2\frac{1}{4}$ miles eastward of Mersa Sidi-Akeche, is of a red colour, 161 feet high, and not seen until it is close to. Some rocks extend half a cable off its eastern and western points, but the channel between it and the coast is a mile wide, with depths of 12 to 23 fathoms; in mid-channel, however, there is a patch of 10 feet, described below. The coast between Jezirat Akeche and Jezirat Tukush forms a bay with a uniform line of cliffs and beach scattered with rocks.

Jezirat Tukush. *Jezirat Akeche.*

Rocks. — Between Jezirat Tukush and Ras Tukush there are the following outlying rocks:—

A rocky shoal, with 13 feet water over it, surrounded by depths of 6 to 9 fathoms, lying 2 cables from the shore, and one mile south-westward of the island.

A rocky head, with 10 feet water over it, situated $5\frac{1}{2}$ cables from the coast, and about the same distance southward of the island.

A rock, with 3 feet water over it, lying 3 cables westward of the point west of Ras Tukush, and a rock on which the depth is 11 feet, situated $1\frac{1}{2}$ cables northward of the preceding; these latter rocks are dangerous to vessels seeking shelter from easterly winds between the island and the cape.

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Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 50′ W.

Ras Tukush (*Lat. 37° 5′ N., Long. 7° 24′ E.*), a steep, rocky promontory, is surmounted by a hill 732 feet high, and off its north-eastern front are two islets, 210 feet above the sea, with scarcely passage for boats between; here there are some fine grottos. A bay on the west side affords shelter for small vessels, but there are several rocks near the shore. A white look-out house, conspicuous from seaward, is situated on the highest part of the cape.

From the eastward or westward Ras Tukush is easily recognised, being salient and appearing isolated, but from the northward it is blended with the elevated land around it. At 2½ miles southward of the cape, Sidi Yahia, with a conical summit on which is a mosque, rises to 1,788 feet above the sea.

Bank.—A coral bank, with a least depth of 11 fathoms over it, lies about 2½ miles northward of Ras Tukush.

Plan of Tukush Herbillon bay on 178.

MERSA TUKUSH HERBILLON, southward of Ras Tukush, is well sheltered from westerly winds, but its beach is so much bordered by rocks that difficulty is experienced in hauling up fishing boats. The small town has about 2,400 inhabitants.

LIGHTS (*Lat. 37° 4′ N., Long. 7° 23′ E.*).—At 650 yards eastward of the village of Herbillon is a white cylindrical tower, 15 feet in height, exhibiting at an elevation of 135 feet above the sea a *fixed white* light, which is visible in clear weather from a distance of 9 miles. For arc of visibility, *see* Light list.

From a standard, 13 feet high, at the head of the jetty, is exhibited a *fixed green* light, elevated 17 feet above the sea, and visible from a distance of one mile in clear weather.

Jetty.—A small jetty extends for 55 yards from the coast at about a quarter of a mile westward of the lighthouse, and has about 10 feet water at its extreme.

Mooring buoys.—Two mooring buoys, for the use of the Custom house, lie eastward of the head of the jetty.

Anchorage off the beach may be obtained in 10 fathoms water, over sand, with the church bearing 270° true and the point of the cape bearing 25° true, completely sheltered from north to west, but open to the eastward; heavy squalls from the north-east send in a considerable sea.

Communication.—Two small steam vessels call every week, weather permitting, for fish sent to Bona; but communication with the interior is difficult.

General charts 2158a, 449.

Plan of Tukush Herbillon bay on 178. Var. 9° 50′ W.

Life-saving station. — A station, to afford assistance in the event of shipwreck, is maintained here.

Coast. — From Mersa Tukush Herbillon the coast trends in a south-easterly direction for 1¾ miles to Pointe Percée, and is high, steep, and cut up by ravines and some sandy beaches; at 8 cables from the bay a rock, 75 feet high, is separated from the coast by a channel about 27 yards in width, with some rocks. A small rocky head, with 2¼ fathoms over it, lies about one cable eastward of the 75-foot rock, and the ground between is foul. Several detached rocks lie about 1¼ cables off Pointe Percée.

Chart 252, Cape Bougaroni to Fratelli rocks, &c.

Ras Akcine (*Lat. 37° 4′ N., Long. 7° 32′ E.*), 5½ miles eastward of Pointe Percée, is at the foot of Gouari, 1,880 feet above the sea, rounded in form, reddish in colour, and appearing the same from all directions; its colour and total want of vegetation render it a good mark. Sidi ben Hout, 2½ miles westward of the cape, and 1,758 feet above the sea, from the northward appears as a truncated cone.

Cap de Garde lighthouse. *Pointe du Pain-de-Sucre.* *Ras Akcine, bearing 145° true, distant 10 miles.*

Rock. — A rock, with a depth of 3¼ fathoms, is situated about 2 miles westward of Ras Akcine, at about half a mile from the coast.

Roche Akcine, one of the most dangerous on this part of the coast, is awash, and situated 5½ cables from the coast, northward of Ras Akcine; it has several rocks near it.

Coast.—From Ras Akcine to Pointe du Pain-de-Sucre, a distance of 9 miles, the coast is formed of a succession of beaches and cliffs, a chain of hills running parallel to the coast from one to 2 miles inland; the principal summits are Chaiba, 2,720 feet; Kef Chegueg, surmounted by a marabut tower, 2,553 feet; and Sidi bu Medine (south-west of the preceding), 2,615 feet high.

On a hill, 627 feet high, situated near the coast, 4 miles south-east of Ras Akcine, the marabut of Sidi Buzid may be recognised from seaward, when not hidden by trees, and at its foot there is the small creek and village of Ain Barbar.

Pointe du Pain-de-Sucre, a pyramidal-shaped hill, 492 feet above the sea, terminating this part of the coast, has three small rocks standing up at its extreme.

General charts 2158a, 449.

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 40′ W.

Voile Noire. — A bay nearly a mile deep lies immediately eastward of Pointe du Pain-de-Sucre, its eastern extreme being Voile Noire, a conical rock, off a point of land which stretches about half a mile to the northward like a mole. From certain positions, when the sun shines on the rock, it appears like a lateen sail. A flat rock nearly awash lies close to Voile Noire, and south-east of it, two bays are separated by Ras Tenfouts.

Voile Noire, bearing 145° true.

Plan 1567, Approaches to Bona.

Cap de Garde (*Lat. 36° 58′ N., Long. 7° 47′ E.*), named by the Arabs Ras el-Hamrah (Red cape), is a barren rocky point projecting to the north-eastward from Edugh, which, at about 9 miles within, rises 3,198 feet above the sea. The coast of the cape is rugged, rocky, and deeply indented by the action of the sea; in passing near it deep caverns and large detached rocks are seen, and fragments of others which form a reef extending 1½ cables from the coast of the cape; a rock with very little water over it lies one cable from the shore northward of the lighthouse. The water outside the reef deepens suddenly.

The most salient point of the cape is known by a small peak, which, at a distance from the westward, appears like an islet. On approaching it another height will be seen at its north part, on which are the ruins of a tower, and on its broken rocky surface are several red patches from which it derives the name given it by the Arabs. From the cape the land gradually rises in a south-westerly direction, forming a chain of crests terminating in Edugh, a peak, which commands all the land in the vicinity of Bona.

Cap de Garde lighthouse, bearing 112° true.

LIGHT.—On Cap de Garde is a square tower, 46 feet in height, with a square dwelling, which exhibits, at an elevation of 469 feet above the sea, a *white flashing* light *every five seconds*, thus:—flash, *half a second*: eclipse, *four and a half seconds*. It is visible in clear weather from a distance of 29 miles.

Signal station. — Semaphore. — A signal station connected by telegraph with all parts is established at Cap de Garde, and vessels can communicate by the International code of signals: the semaphore

Plan 1567, Approaches to Bona. Var. 9° 40′ W.

is situated on the summit of Sidi Nore, at an elevation of 538 feet above the sea, 2 cables south-westward of the lighthouse. Call letters A K X G.

Mooring buoy.—A mooring buoy lies in the small bight on the south-west side of Cap de Garde.

The GULF of BONA (*Lat. 37° 0′ N., Long. 8° 0′ E.*), formed between Cap de Garde on the west and Cap Rosa on the east, is 21 miles across and 7 miles deep. The central part of the coast is low, and chiefly consists of a sandy beach with downs and extensive plains to the southward; the rest of the coast is also low, and partly formed of cliffs, which become gradually higher towards Bona and Cap Rosa.

A little more than a mile to the south-westward of the east extreme of Cap de Garde, is a rounded headland steep over the sea, upon which stands Fort Génois; rocks, some of which are uncovered, and shoal water extend 2 cables eastward of it, so caution is required in passing. The *green* sector of Jetée du Lion (Bona) light shows over these shoals. The land between the cape and the headland forms a bay with a small beach, at the south end of which a stream of good water flows into the sea. With the exception of this beach the coast is steep and rocky.

Aspect. — At a distance from the offing the Gulf of Bona appears larger than it really is. The high land over Cap de Garde increases in elevation as it recedes southward from the cape, and is apparently isolated, and Cap Rosa appears the same, whilst between the two capes only the summits of the distant mountains are seen, the land at the head of the gulf being low and not visible, the latter appears deeper than it really is.

Two mountains may be observed in the middle of the gulf southward of the Wadi Mafrag, the outlines of which change but little, and when seen may be known from any quarter; Jebel Bu-Abaid, the highest and easternmost, is 2,434 feet high.

From the north-westward a vessel's position will be known by the mountains of Edugh and Cap de Garde, and from the north-eastward by Cap Rosa.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the

Plan 1567, Approaches to Bona. Var. 9° 40′ W.

vessels escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port of Bona are **earnestly requested** to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:—

(*a*) By the arc of a circle drawn with Fort Génois as centre, with a radius of 4 miles, meeting the coast on the south, and the alignment 216° true of Fort Génois and Cap de Garde on the north.

(*b*) By the arc of a circle drawn with Cap de Garde lighthouse as centre, with a radius of 3 miles, meeting the coast on the west and the alignment of Fort Génois and Cap de Garde on the east.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

Anchorage of Fort Génois.—From Fort Génois the coast recedes westward, forming a bay named Baie du Lazaret, about a mile wide, with a sandy beach at its head, which affords shelter from westerly winds round to a little eastward of north in 13 and 14 fathoms water, over mud and sand, about 3 cables southward of Fort Génois. During summer, with strong northerly and westerly winds, heavy squalls and eddies blow down from the high land. In the rear of the beach is a beautiful valley with water, but the water is not so good as that in the bay northward of the fort.

LIGHT (*Lat. 36° 57′ N., Long. 7° 46′ E.*).—A *fixed white* light is exhibited, at an elevation of 197 feet above the sea, from a masonry tower, 23 feet in height, and situated 440 yards westward of Fort Génois; it is visible in clear weather from a distance of 7 miles. It is obscured over the shoals off Fort Génois.

Life-saving station.—A rocket apparatus is maintained a short distance southward of Fort Génois.

Baie du Caroubier.—About 1¼ miles southward of Fort Génois is another bay (not so large nor so deep as the former) named Caroubier from some trees of this name in its north corner. The bay has two clean sandy beaches separated by cliffs on which are numerous country houses, and on the south beach is a marabut tower. Small vessels anchor near the beach in 4 or 5 fathoms water, sheltered by the north point of the bay, on which there is a battery, and a reef extends southward from it; large vessels anchor farther off. Though this anchorage is not so safe as Fort Génois anchorage, it has been more resorted to in consequence of its proximity to Bona.

Shoal water extends generally, in the bay, from one cable to 2 cables from the shore, and off the south point a pinnacle rock, with a depth

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Plan 1567, Approaches to Bona. Var. 9° 40′ W.

of 4 feet over it, lies one cable from the shore about 5½ cables north-westward of Pointe du Lion; between this rock and Jetée du Lion, shoal water extends from 1½ to 2 cables from the shore.

Life-saving station.—A life-saving station, furnished with a rocket apparatus, is maintained at the Custom-house, Le Caroubier.

Pointe du Lion, 3½ miles southward of Cap de Garde, is high and steep with a battery on it, and at its north-east extreme is an isolated rock about 55 feet above the level of the sea, which when seen from the northward or north-eastward, has a slight resemblance to a lion; this rock is artificially joined to the mainland. The point is the Ras el-Hamen (cape of the pigeons) of the Arabs, deriving its name from the number of silver pigeons which inhabit its rocky face. On a height half a mile westward of the point is the Kasba or Citadel of Bona.

BONA HARBOUR (*Lat. 36° 54′ N., Long. 7° 47′ E.*).—From a small rock off Pointe du Lion, which is joined to the mainland, Jetée du Lion extends in an east-north-easterly direction for about 200 yards, and then turns in a south-easterly direction for about 750 yards, having a curve to the southward at its southern end.

Jetée Babayaud, which commences from a point on the shore about 2½ cables south-westward of Pointe du Lion, extends in a south-easterly direction for a distance of 300 yards. A quay southward of the inner end of Jetée du Lion, is for vessels with explosives.

Mole Cigogne extends southward for 200 yards from the point near old Fort Cigogne, and from its base quays extend for a distance of 660 yards in the direction of the base of Jetée Babayaud, forming the north-western side of Grande Darse.

Westward of Grande Darse is situated a small basin, Petite Darse, having an area of 24 acres. The jetties round this basin are about 800 yards in length.

The Port and Health offices are near the northern entrance to Petite Darse.

From a point opposite the south end of Mole Cigogne, Jetée Est, extends in a north-easterly direction towards the south extreme of Jetée du Lion for a distance of about 1,400 yards, forming the south-eastern side of Grande Darse and of l'Avant-port. On the inner end of this jetty is a quay, 380 yards long, for shipping phosphates, &c.

At 450 yards within the outer extreme of Jetée Est an arm curves to the northward for a distance of 350 yards, and between the extremity of this arm and Jetée Babayaud is a channel about 130 yards broad, forming a passage between l'Avant-port and Grande Darse.

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Plan 1567, Approaches to Bona. Var. 9° 40′ W.

Avant-port has an area of about 100 acres; the entrance is between Jetée du Lion and Jetée Est, and is about 1¼ cables wide.

Grande Darse has an area of about 220 acres.

Depths. — The depth in the entrance to l'Avant-port is 6½ fathoms, and in l'Avant-port there is for the greater part this depth. Grande Darse is dredged throughout to 31 feet, and Petite Darse to 27 feet.

LIGHTS.—Jetée du Lion (*Lat. 36°54′N., Long. 7°47′E.*).— A *group occulting white* light, with a *green* sector, showing *three eclipses every ten seconds*, is exhibited, at an elevation of 62 feet above the sea, from a stone turret 56 feet in height, situated 19 feet from the extreme of Jetée du Lion; it is visible in clear weather from a distance of 11 miles. For sectors, *see* Light list and plan.

Jetée Est.—On the head of Jetée Est is exhibited, from a white metal turret, 34 feet high, a *red occulting* light *every five seconds*, thus:—light, *four seconds;* eclipse, *one second*. It is elevated 49 feet above the sea, and is visible from a distance of 5 miles.

Grande Darse. — On the northern side of the entrance from l'Avant-port into Grande Darse is exhibited, from an iron stanchion over a hut, at an elevation of 26 feet above the sea, a *fixed green* light.

On the southern side of the entrance is exhibited, from a similar stanchion, at the same height, a *fixed red* light.

Mole Cigogne. — From the south-east corner of Mole Cigogne is exhibited, at an elevation of 26 feet, a *fixed green* light, visible for a distance of 4 miles. For arc of visibility, *see* Light list and plan.

Petite Darse. — At the entrance to the Petite Darse a *fixed green* light is shown from the Jetée Nord, and a *fixed red* light from a dolphin close to the Jetée Sud; these lights in clear weather are visible from a distance of 2 miles.

Mooring buoys.—There are three mooring buoys in l'Avant-port.

Pilots are available day and night; they go off to vessels when well off the entrance to the port.

Anchorage. — When anchoring outside the port, the best position is eastward of Jetée Est in from 6 to 9 fathoms water, over muddy sand and good holding ground.

In bad weather and a heavy sea, rather than anchor outside Bona, it is more prudent to anchor at Fort Génois or Baie du Caroubier; but in the event of a heavy north-easterly gale neither of these anchorages are safe.

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Plan 1567, Approaches to Bona. Var. 9° 40′ W.

Town (*Lat. 36° 54′ N., Long. 7° 47′ E.*).—The fortified town of Bona, named by the Arabs Beled-el-Anab (the town of jujubes), stands on the base of Edugh mountain, and about a mile northward of the ruins of the ancient city of Hippo Regius, once a residence of the Numidian kings, and a see of St. Augustin. Its streets are narrow and tortuous, but there are several good houses, shops, a market, and theatre; the population in 1910 was 43,000. A British Vice-Consul is resident.

The city is surrounded by a wall a mile in circuit and 26 feet high, and about a quarter of a mile to the north of it is the Kasba or citadel, on a hill 390 feet above the sea. The Arab quarter runs up the southern flank of this hill, and the European quarter is at its foot.

Communication. — By steamships with Marseille three times every week; weekly to Ajaccio, Porto Torres, Philippeville, Collo, Jijelli, Bougie, Algiers, La Calle, Tabarka, Bizerta and Tunis. Railway communication with Algiers and Tunis; the branch joining the main line at Duvivier Junction. A line connects Bona with La Calle, a distance of 56 miles, and there is a line to Guelma and one to the mines of Mokta el Hadid. Telegraphic communication with all parts. The telegraph office is open until midnight.

Submarine telegraph cables. — Two submarine cables are laid from Bona to Marseille, two to Malta, and one to Bizerta.

Coal. — About 7,000 tons of coal and patent fuel are kept in stock. There are 7 lighters holding 100 tons each, all of which are kept loaded; from 500 to 800 tons can be put on board in 24 hours. There are two coaling wharfs, each 600 feet long, and having a depth of 24 feet alongside. Telegraphic notice of requirements should be sent.

Supplies. — Fresh provisions may be procured, and good water, from numerous cocks on the quays, which is supplied free to war vessels. There is no water tank.

Life-saving station. — A life-saving station, with a rocket apparatus, is maintained at the Custom-house, also a life-saving apparatus in a steam pinnace.

Repairs. — Small repairs to machinery might be effected at the workshops of the Mokta el Hadid Mineral Company.

Trade. — The principal exports are wine, phosphates, esparto grass, wheat, barley, oats, cork wood, iron and zinc ores, sheep and cattle, and hay; the imports are chiefly coal and patent fuel, timber and building materials, petroleum, and salt.

Shipping. — In 1910, 590 steam vessels, with a total tonnage of 639,766 tons, entered the port, and 98 sailing vessels, with a total tonnage of 9,572 tons.

General charts 252, 2158a, 449.

Plan 1567, Approaches to Bona. Var. 9° 40′ W.

Port regulations.—All vessels entering or leaving the harbour are to conform to the following regulations:—

(1) Steam vessels or sailing vessels entering have precedence over steam vessels or sailing vessels leaving. Mail steamers, carrying mails, however, have precedence for entry and for exit.

(2) The following measures will be taken to assure the application of this rule:—Every mail steamer carrying mails and coming from the open sea will signal her presence at the entrance to l'Avant-port by sounding a double, very prolonged whistle. At this signal all vessels in movement in the harbour will manœuvre in such a manner as to allow the mail steamer every facility for crossing l'Avant-port, Grande Darse, and to perform evolutions in Petite Darse. Every steam vessel preparing to enter the harbour should signal her presence, when she is yet beyond the jetties, by a prolonged whistle. If there is a mail steamer about to leave she will answer by sounding two prolonged whistles, which will oblige the steam vessel arriving to remain outside the jetties, unless she prefers to go, at her own risk and peril, into l'Avant-port or Grande Darse, not in the route followed by vessels entering or leaving, in such a way as not to inconvenience the departure manœuvres of the mail boat. If there is no response to her whistle the vessel arriving may freely enter.

(3) In the case in which two vessels going in opposite directions find themselves at the same time in Grande Darse, each must keep to her *port hand* (not her starboard hand, according to Rule of the Road). The regulations in the Rule of the Road, however, must be followed when in l'Avant-port or Petite Darse.

If the vessel entering Grande Darse wishes to go alongside Quai Nord she must give way, as stated in Article 2, except in the case where she would have time to secure alongside the quay without barring the route to the one that is leaving.

All vessels in movement must use the sound signals as directed in the regulations for the Rule of the Road.

(4) When two vessels proceeding in opposite directions are likely to meet in Passe Babayaud, the one wishing to leave must wait until the one which is entering has completely effected her entrance into Grande Darse, in order to avoid any collision.

(5) Vessels doing lighterage in the harbour, service boats, barges, pontoons, mahonnes, Customs boats, tank-vessels, and others, as well as all boats employed in fishing, must always allow liberty of manœuvre to all other vessels entering or leaving and in movement in the harbour.

Local winds.—During the fine weather season, May to September, the land wind in the morning increases till about 6 o'clock, when

Plan 1567, Approaches to Bona. Var. 9° 40′ W.

it becomes light and dies away about 8 a.m. Between 9 and 10 a.m. the sea breeze sets in from the north-eastward and freshens till 2 p.m., at sunset it falls gradually, and dies away about 9 p.m. Sometimes during this period, easterly and north-easterly winds blow with great violence.

In the winter the prevailing winds are from west to north. Rains generally accompany winds from south-west to west. With north-west winds there are constant squalls of extreme violence, and if the barometer does not rise the wind frequently shifts to the south-west: on the contrary, should the barometer rise, it will shift to the northward.

Wadi Seibus (*Lat. 36° 55′ N., Long. 7° 47′ E.*), the entrance to which is half a mile southward of Petite Darse, is one of the few rivers in Algeria that retains its water in the summer, and is the only one that is navigable for small boats for some distance. After the rainy season quantities of mud and sand are washed down the river, which alter the bar and banks off the mouth nearly up to l'Avant-port. Between the Wadi Bujema and Wadi Seibus is a hill on which are some vestiges of the ancient city of Hippo Regius.

A bank of coral, on which the depth is 6 fathoms, lies 3 miles south-eastward from the mouth of the Wadi Seibus and $1\frac{3}{10}$ miles from the shore.

Chart 252, Cape Bougaroni to Fratelli rocks, &c.

Coast. — Between the mouth of the Wadi Seibus and Cap Rosa, the eastern extreme of the Gulf of Bona, the first half of the coast is formed of sand and downs, with numerous lagoons and rivulets, to the southward of which are extensive plains. At about 10 miles from Bona is the mouth of the Wadi Mafrag, nearly a cable wide; it is frequented by the boats employed in the coral fishery: 10 miles southward of the entrance to the river is Jebel Bu Abaïd, previously described, and on a hill 151 feet above the sea, at the eastern side of the entrance, there is a signal staff.

The sands continue for 3 miles beyond the river, and the land becomes gradually higher with cliffs as far as Cap Rosa. About $6\frac{1}{2}$ miles from the Wadi Mafrag is Calle Traverse, a small cove, much obstructed by rocks, but the coral fishing boats find shelter in it; one mile westward of this cove there is a small but remarkable cone, 292 feet high.

To the south-westward of Cap Rosa there are two other coves used by fishing vessels, where water and fuel may be obtained. Cala del Prisionero, the larger and western, has a shingle beach at its head, and on its south side a rocky cliff, with a building on its summit.

General charts 2158a, 449.

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 30′ W.

Cap Rosa (Cap Rose), 295 feet high, is covered with brushwood and terminates in cliffs, from which a mass of land rises 1,079 feet above the sea. Near the cape, and especially about 5 miles northward of it, is the best coral fishing ground on the whole coast of Africa, the coral being found in from 35 to 45 fathoms water. To the eastward of Cap Rosa there are two coves with shingle beaches; they are exposed to north-easterly winds, and are only suitable for small vessels with winds from the opposite quarter.

Cap Rosa lighthouse (Cap Rose). *Edugh, Bearing 260 true, distant 35 miles.*

LIGHT (*Lat. 36° 57′ N., Long. 8° 14′ E.*).—From a circular white stone tower, 43 feet in height, in centre of a rectangular building, erected on this cape, is exhibited a *white group flashing* light, showing groups of *two* flashes *every ten seconds*, thus:—flash, *three-quarters of a second;* eclipse, *two and a quarter seconds;* flash, *three-quarters of a second;* eclipse, *six and a quarter seconds.* It is elevated 418 feet above the sea, and is in clear weather visible from a distance of 25 miles.

Coast.—South-eastward of Cap Rosa there is a sandy bay named Grand Canier, where a stream, frequently dry in summer, runs into the sea; this bay affords good anchorage with westerly winds, but should be quitted with any indication of a change to the eastward.

Baie du Petit Canier lies one mile to the south-eastward and is separated by a small rocky point, about 30 yards from which there is a large sugar-loaf rock, named Eschiavone, 115 feet high, having a rocky flat, with a depth of 6 feet water over it, extending more than half a cable northward of it.

This bay also affords anchorage, with westerly winds, in from 5½ to 6½ fathoms water about 3 cables from the beach, through which a small stream runs into the sea.

Coast.—About 4 miles to the south-eastward of Cap Rosa the coast, bordered by sand dunes, is broken by the entrance to a lake or lagoon, Bheira Guera-el-Melah, which abounds in fish, and communicates with the sea; small boats can enter the lake.

Immediately eastward of the entrance to the lake is Cala Cavallo, and 4 cables north-westward of its eastern point there is a rock, with 14 feet water over it.

At 2 miles eastward of the mouth of Bheira Guera-el-Melah are the ruins of the town of Bastion on a red cliff: it was one of the first establishments of the French in Africa, but was abandoned to form

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 30′ W.

that of Cala; there is a village near it, and to the westward Vielle Calle, a creek, about 1½ cables in width and open to the northward, has a small point on its eastern side which affords shelter to small vessels from winds between north and east.

Cap Gros.—A mile farther on is a low point named Ras Mzina, projecting a little, and difficult to distinguish unless near it, thence follows Cap Gros, which is 8 miles from Cap Rosa. All the above coast is composed of sandy beaches and sinuous cliffs. Cap Gros is round and rises to 764 feet above the sea, a peak on its eastern part rendering it conspicuous. At a mile from this part of the coast there are from 18 to 28 fathoms water, over sandy bottom.

Plan of Port de la Calle on 252.

Coast. — Black point (Pointe Noir), 49 feet above the sea, is situated 1¾ miles eastward of Cap Gros, and between is a bay with a sandy beach; on the west side of the point there is a small island named Mandite, 36 feet high, and on the eastern side of the point Mill bay (Anse du Moulin), a small creek, affords shelter to fishing boats; rocks and shoal water extend nearly a cable off Black point.

PORT DE LA CALLE, or Cala, 2 miles eastward of Cap Gros, is a small cove open to the north-westward, about 130 yards in breadth and 330 yards in length, and 15 acres in extent, bounded on the north by a quay along the shore of a small rocky peninsula named Ile de France. At the entrance to the cove there is 15 feet water, and about 9 feet in the middle, so that it is only accessible to small coasters, which are hauled on the beach during bad weather from the westward.

LIGHT (*Lat. 36° 55′ N., Long. 8° 27′ E.*).—A *fixed red* light is exhibited, at an elevation of 55 feet above the sea, from a circular tower, 24 feet in height, with a building attached, situated on Ile de France, and in clear weather it is visible from a distance of 10 miles.

Signal station.—The signal station is at Fort du Moulin, half a cable southward of the south entrance point, and a red flag at the signal mast denotes that the entrance channel is dangerous. Passing vessels can communicate by the International code.

Rocks.—Two rocks, above water, lie at the entrance, one on the south side about a third of a cable from the shore, and the other, with rocks extending a short distance northward of it, in the middle of the entrance: this rock is surmounted by a life-saving rocket mortar.

Buoys. — Two lines of small red and black buoys indicate the deepest channel to the head of the port.

General charts 2158a, 449.

Plan of Port de la Calle on 252. Var. 9° 30′ W.

Anchorage.—Vessels requiring to anchor off La Calle should do so about 4 cables northward of the lighthouse in depths of 11 to 13 fathoms, over sand and gravel, and be ready to leave on the first indication of the approach of bad weather.

Town.—La Calle formerly was the centre of a large coral fishery, and was annually resorted to by a large number of boats, but now the fishing is practically abandoned. The town, originally on the peninsula (which is connected to the main by a low neck of sand), was one of the old establishments of the French African company in the regency of Algeria; it was afterwards extended beyond the neck, and is surrounded by a fortified wall. Since the abandonment of the coral fishing the town has fallen into decay. It had extensive works for the preparation of sardines, but now only a few Italian boats visit the place in the fine season for the fishing; on the beach is a fountain.

Communication. — The steamers of the Compagnie Generale Transatlantique, running between Bona and Tunis, call weekly, weather permitting. La Calle is connected with Bona by a railway and has telegraphic communication with all parts.

Submarine telegraph cable. — There is a submarine cable between Port de la Calle and Bizerta.

Supplies are not abundant, but water may be easily obtained from pipes on the quay.

Life-saving station. — Besides the mortar already mentioned the life-saving station is furnished with another rocket apparatus.

Chart 252, Cape Bougaroni to Fratelli rocks, &c.

Coast.—From La Calle the coast has an easterly direction, and is rocky and broken by small creeks; several rocks lie from 1½ to 2 cables off-shore, the most dangerous being those situated north-west of Rocky point (Pointe des Roches) (Pointe du Cimetière), about half a mile eastward of the port; these rocks and shoal water extend 2¾ cables from the point. This part of the coast is bordered by dunes, from 300 to 500 feet above the sea, and covered with brushwood.

Crique de Tonga (*Lat. 36° 55′ N., Long. 8° 31′ E.*), 3 miles eastward of La Calle, is small, sandy, and sheltered by two or three islets; here the Wadi Messida runs into the sea, and communicates with the fresh-water lake named Hut or Tonga.

Round mount (Kef Mechtob), 591 feet high, and about two-thirds of a mile south-eastward of Crique de Tonga, is isolated, conical, with its summit somewhat flattened, and forms the best sea mark on this part of the coast. Between this and Cap Roux, a distance of 4 miles,

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 30′ W.

the coast offers no particular features; it is bordered by little cliffs between which are sandhills.

About 3 miles south-east of Round mount there are lead mines, and 2½ cables eastward of the mouth of the Wadi el-Harg two high chimneys are conspicuous. The description of this coast is continued on page 416.

Chart 1200, Galita island.

GALITA ISLAND (*Lat. 37° 31′ N., Long. 8° 56′ E.*), ancient Calathe, lying off the western boundary of Tunis, is 20½ miles north-north-westward from Cap Serrat, and is 2¾ miles in length, in an easterly and westerly direction, and between half a mile and 1½ miles in breadth, its east end being the broadest.

The coasts are irregular, with rugged cliffs, grassy slopes, and small beaches, from which the land rises and forms several peaks, Monte Guardia, in the centre of the island, being 1,240 feet, and Sugar-loaf peak at its south-eastern extremity, 1,175 feet above the sea. *See* view on chart.

With the exception of a rock about a cable off the central part of the east end, another about the same distance off the north side, and the rocky shoal extending about 1½ cables from its north-west end, the island is clear of danger and generally steep-to.

A few Sardinian fishermen, under French protection, always live on the island, their habitations consisting of huts and caves near the bay on the south side.

Anchorages.—The island is easily recognised from its outline: the south-eastern extremity is steep and rugged, and the Sugar-loaf peak over it appears isolated when seen from the northward or southward, and at a distance of 30 or 35 miles. In a bay on its south side temporary anchorage may be obtained in 10 or 11 fathoms water, over fine sand and weeds, but in heavy gales from the northward the sea runs round the island and causes vessels lying far out to roll heavily. In strong winds from the northward heavy squalls and eddies blow down from the high land, rendering caution necessary in approaching the anchorage in a sailing vessel.

The east coast of the island is about 1¼ miles in extent, and on the north part of it, in a small bay named Cala Levante, some shelter may be found from westerly winds, anchoring in depths of 10 or 12 fathoms, about 2 miles from the shore.

Temporary anchorage may also be obtained in a small bay with a sandy beach on the north side of the island, in from 4½ to 5½ fathoms water, over sand.

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Chart 1200, Galita island. Var. 9° 30′ W.

Communication is carried on by boat every alternate month with Bona, about 65 miles to the westward, where fish, especially lobsters, are taken and exchanged for provisions.

Supplies. — Fresh water is plentiful on Galita: rabbits and wild goats abound. Small patches of land are under cultivation, and a few tame goats kept, but no supplies are obtainable.

There are three or four places where water may be obtained: the best place is on the eastern side of the shingle beach that faces the southern anchorage.

Life-saving station. — A life-saving station, furnished with a rocket apparatus, is maintained on Galita island.

Islets.—Off the northern end of Galita are three islets, lying in a north-easterly and south-westerly direction. Canis or Gallo, the outermost and largest, is about a mile distant; Pollastro is the centre and smallest; and Gallina, the innermost, is half a mile from the island. Between these islets there are from 4½ to 8 fathoms water; and in mid-channel, between the islets and Galita, from 10 to 11 fathoms.

Shoal.—About half a mile northward from the north extreme of Canis islet is a rocky patch, with 3¼ fathoms water over it and 10 fathoms close-to. These islets, therefore, should not be approached nearer than a mile.

Galitona and Aguglia islets (*Lat. 37°.30′N., Long. 8°.53′E.*). —At nearly 1½ miles south-westward of the south-western end of Galita are two other islets larger than those off its northern end, together extending three-quarters of a mile in a westerly and easterly direction, separated by a channel two-thirds of a cable wide, and in which is a depth of 1½ fathoms.

Galitona, the western and larger islet, is 4 cables in length, 518 feet high, and its south-western end is surrounded with rocks, which extend a cable off. Aguglia has three peaks, that to the eastward being conical shaped and 420 feet high: its western part is nearly separated from the rest of the island by a low sandy neck.

With the exception of the rocks at the south-west end of Galitona, these islets are clear of danger and steep-to, and in the channel between them and Galita, there are from 12 fathoms on both sides to 18 fathoms midway.*

Chart 252, Cape Bougaroni to Fratelli rocks, &c.

SORELLE ROCKS consist of two rocky shoals, lying east and west of each other about three-quarters of a mile apart, and having 30 fathoms water between. The eastern shoal, sometimes known as

* A shoal with 3¾ fathoms over it was reported, in 1913, to lie about half a mile north-eastward of Galitona islet. An examination of this locality is to be made

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 30′ W.

Avenger shoal, is about 1¼ cables in extent, and awash; it bears 244° true, distant 13½ miles from the north end of Galitona. The western shoal is about 3½ cables long, and has 4 feet least water over it.

The passage between Galitona and Galita open, bearing 76° true, leads northward; and the summit of Galita, in line with the peak of Aguglia, bearing 49° true, leads southward of the rock. *See* views A and B on chart.

Current.—The German vessel, *Australia*, which stranded on Sorelle rocks, found for 8 days, almost regularly, by day with a rising tide the current set to the southward and by night with a falling tide the current set to the northward; the rise of tide amounted to 1½ feet, and the strength of the current was sometimes over 3 miles an hour. For two days only, with fresh easterly and westerly winds, was the current setting in the same direction as the wind. A moderate breeze apparently had no effect on the force or direction of the current. *See* also remarks on Current, page 54.

CAUTION.—As Sorelle rocks are steep-to, and the currents in their vicinity are very irregular, running from one to 3 knots an hour, the utmost caution is necessary when navigating in this locality.

Depths off-shore.—The 100-fathoms line of soundings skirts the coast at less than 2 miles from Cap de Fer, passing 9 miles from Cap Rosa, and nearly the same distance northward of Cap Serrat, but here there is only a very narrow trench of over 100 fathoms between the coast bank and Galita bank.

Retriever bank (*Lat. 37° 11′ N., Long. 8° 31′ E.*).—Soundings, taken by the telegraph vessel *Retriever* in the year 1883 in Galita channel, show a bank of soundings having 26 to 50 fathoms, coral, and lying nearly midway between Sorelle rocks and Cap Rosa. The bank is about 4 miles long in a northerly and southerly direction, and its shoalest part is situated 12 miles south-south-westward from Sorelle rocks.

On Galita bank, which surrounds Galita island and Sorelle rocks, and extends 34 miles northward of Cap Serrat, the soundings vary from 15 to 80 fathoms, the former depth being found 8 miles northward of Galita. From its edge the water deepens suddenly, and at less than 10 miles westward of Sorelle rocks there are more than 1,000 fathoms; in the channel between these islands and Sardinia the central depth appears to be 1,646 fathoms, over mud.

TUNIS.—Cap Roux, Ras el-Zaghlam of the Arabs, lies about 4 miles eastward of Round mount, and is so named from the colour of its rocks; a short distance within the cape, Jebel Segleb rises to

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 30′ W.

1,073 feet above the sea. It projects somewhat to the north, is steep on all sides, has the ruins of fortifications on the summit of its eastern extremity, and it is easily recognised by its barren appearance and red colour. Coral is found in abundance in from 35 to 45 fathoms water, on this part of the coast, between the meridians of Cap Rosa and Ras Tabarka.

Anchorage.—A small bay, with a sandy beach, on the east side of Cap Roux, affords shelter to small vessels during westerly winds.

Boundary.—The boundary between Algeria and Tunis is in the bay, in lat. 36° 56′ 30″ N., long. 8° 31′ E. (approximate).

Coast. — Between Cap Roux and Ras Tabarka, a distance of 6½ miles, the coast is high, rocky, and formed of cliffs, interrupted by small sandy beaches, and is skirted by rocks, covered and uncovered, extending, in places, 1½ cables from the shore; at 1½ miles eastward of Cap Roux there is a point separating two sandy beaches, and 3½ miles further on is Pointe Galèna, eastward of which is a small bay sheltered from the westward but obstructed by some rocks awash; the Wadi Nutala, which is generally dry, flows into the head of this bay. Between Pointe Galèna and Ras Tabarka there is a small white house, on a summit near the coast, which is conspicuous.

Plan of Tabarka anchorage on 252.

Ras Tabarka, formed of grey cliffs, is surrounded by rocks, the farthest from the shore being a small islet, 39 feet high. The cape is commanded by a mountain 1,465 feet high, by which it may be known. From the cape the coast trends to the south-eastward, forming a bay with coast partly of cliff and beach; shoals extend from off its eastern end near Jebel Maruna (Moruna), for nearly half a mile. On the coast near the head of the bay is a fort and some huts. A chain of hills extends in a south-westerly direction to Jebel Abdalla, 3,281 feet high, and 12 miles from the cape, and thence north-eastward for about a similar distance, enclosing Labhera plain. About 6 miles south-westward of Jebel Abdalla is Jebel Adissa, 2,953 feet high, and a very conspicuous cone, as seen from the northward. *See* view on chart 252.

Ile de Tabarka, situated 7 cables south-eastward of Ras Tabarka, and about 2 cables from the shore, is 4 cables in length in a north and south direction, and nearly connected to the coast by a neck of sand. It is 210 feet above the sea, rocky, and barren, with the ruins of a Genoese castle, and store, and other houses on its north end, which terminates in vertical cliffs; numbers of rocks surround the island, some extending about three-quarters of a cable from the shore. At a distance from the offing the island is blended with the coast, but is known by the buildings. *See* view on chart 252.

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Plan of Tabarka anchorage on 252. Var. 9° 20′ W.

A jetty, 165 yards in length, is built on a line of rocks extending from the south-west point of the island, and between it and the sandy neck, with about 3 feet water over it, which joins the island to the shore, is the port, nearly a cable in length and dredged to a depth of 13 feet. Burj Jeded, with a battery and barracks, is about 1½ cables from the shore, from which a wharf extends with a small landing stage at its extremity.

LIGHTS (*Lat. 36° 58′ N., Long. 8° 46′ E.*).—From a white masonry structure, 26 feet high, erected on the ruins of the old castle on this island, is exhibited a *white occulting* light *every four seconds*, thus:—light, *three seconds;* eclipse, *one second.* It is elevated 236 feet above the sea, and is visible from a distance of 19 miles in clear weather.

On the wharf a *fixed red* light is shown, at an elevation of 26 feet above the sea, from an iron pole, 9 feet in height, surmounting a shed. It is visible in clear weather from a distance of 2 miles. For arc of visibility, *see* Light list.

Beacon.—A white beacon, surmounted by a ball, marks the channel from the eastern anchorage to the village.

Mooring buoy.—There is a mooring buoy westward of the south point of Île de Tabarka.

Anchorages.—There is a bay on each side of the island; the western being the more sheltered, but only suitable for small vessels, and the numerous coral boats which visit the island. The bay on the east has a sandy beach, and affords anchorage in summer, for large vessels, sheltered from westerly winds, in from 5 to 7 fathoms water, over hard sand, about half a mile from the beach, and about 3 cables from the island, with its north extreme bearing 305° true.

With north-westerly winds a sea sets in, which, though inconvenient, is not dangerous in the fine season. In winter it is advisable to remain no longer than is necessary at this anchorage.

Village.—The village, composed of some European and native houses, is on the shore, south-east of Burj Jeded; a rectangular building stands above the modern houses. Only a few supplies can be obtained.

Life-saving station.—A life-saving mortar is maintained at Tabarka.

Communication.—Weekly steamship communication with Bona, La Calle, Bizerta, and Tunis; telegraphic communication with all lines. There is a carriage-road to La Calle.

Chart 252, Cape Bougaroni to Fratelli rocks, &c.

Coast.—Eastward of Tabarka the coast is a sandy beach with a slight bend, backed by high land and increasing in elevation, with

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 20′ W.

cliffs, towards Cap Negro; 3 miles from Île de Tabarka is Jebel Maruna (Moruna), a rocky hill about 330 feet above the sea, and for some miles to the eastward of this the coast is covered with remarkable sandhills. The shore is free from danger, and a depth of 5½ fathoms will be found at half a mile distant from it.

Several small streams enter the sea on this coast, the Wadi Zuara, which abounds with fish, being the most important.

A small river runs into the sea eastward of Jebel Maruna, and on a small hillock on its left bank there is a square grey tower; in this neighbourhood there are important iron mines.

Cap Negro (*Lat. 37° 6′ N., Long. 9° 2′ E.*), 5 miles to the north-eastward of the Wadi Zuara, is of a dark colour, pointed towards the west and the central part of a steep rocky coast, 6 miles in extent; south-eastward of the cape Mont Cap Negro, or Kef Budma, rises 1,562 feet above the sea.

At the western extremity of the cliffs of Cap Negro the point projecting to the south-westward forms, with the coast, a little cove suitable for small vessels during summer, but it is exposed to winds from the westward, and the bottom is strewed with rocks; at the head of the bay are some ruins. The coast is bordered by a ridge of mountains, the slopes and summits of which are covered with cork trees.

Coast.—Cap Kavansur, situated 3 miles north-eastward of Cap Negro, is indented, rocky, and bordered by rocks, covered and uncovered, extending from 1½ to 2 cables from it; about a mile west-south-westward of the point there is a pinnacle rock, with 13 feet over it, and about 300 yards to the eastward of the rock a small shoal about half a cable long and three-quarters of a cable broad, running parallel to the coast, with a depth of 6 feet over it; about 1¼ miles south-eastward of the point is a conspicuous sandy cone, 1,115 feet high.

To Sidi Mishrik, 5 miles eastward of Cap Kavansur, the coast is alternately rocky points and small beaches. Sidi Mishrik is used as a boat harbour; on a central rocky head are the ruins of a tower, with a marabut on a hill within.

From Sidi Mishrik, the coast rising in cliffs has a north-easterly direction for 6 miles to Cap Serrat, and is clear of dangers.

Cap Serrat, 14½ miles north-eastward of Cap Negro, is the Ras el-Munchihar of the Arabs. It is steep and high, and has a ridge extending north-eastward and south-westward on which are three summits (of the same altitude) 607 feet above the sea, which from a distance appear like islands; it projects to the north-eastward, and is indented and skirted by rocks extending a short distance; the southern side presents gentle slopes covered with vegetation. At a distance the

General charts 165, 2158a, 449.

Chart 252, Cape Bougaroni to Fratelli rocks, &c. Var. 9° 20′ W.

appearance between the cliffs of Cap Negro and Cap Serrat is that of a large valley.

About 4 miles southward of the cape Jebel Zelzla is 889 feet and Jebel Ahmar, 1,090 feet high.

LIGHT (*Lat. 37° 14′ N., Long. 9° 12′ E.*).—On the north-eastern summit of Cap Serrat, a low white tower on a rectangular building, 43 feet in height, exhibits, at an elevation of 616 feet above the sea, a *white group occulting* light with *red* sector, showing groups of *two* occultations *every eight seconds*, thus:—light, *five seconds;* eclipse, *one second;* light *one second;* eclipse, *one second.*

In clear weather the *white* light is visible from a distance of 25 miles and the *red* light 19 miles. For sector, *see* Light list and chart.

Semaphore.—There is a semaphore and signal station on Cap Serrat; it is addressed by the letters A K W P of the International code.

Anchorage.—On the east side of the cape is a bay with a low sandy beach, affording shelter to vessels, in case of necessity, from westerly winds. The channel between the cape and Galita island is nearly 21 miles wide.

Currents.—The currents about Cap Serrat and in the channel of Galita are irregular, and generally run according to the prevailing wind; under ordinary circumstances, however, the set is more to the west and south-west than in other directions, at rates varying from one knot to 3 knots an hour. Mariners should therefore be cautious when in the vicinity of Galita, with the wind from the eastward. *See* also Currents and caution, page 416.

Charts 252 and 250.

Coast.—Ras Alluglea is 8 miles eastward of Cap Serrat, and from 2 miles eastward of the latter to one mile from the former the coast is rocky, indented and with some rocky heads off it, but clear of danger at a little distance; inland on the western part are the three conical summits of Jebel Leblidah, 760 feet high, and at the east extreme Jebel Loko, a small sugar-loaf hill, 415 feet high.

Between Jebel Loko and Ras Alluglea there is a sandy beach through which the Wadi Berka (Bered) enters the sea: the banks of this stream are dangerous quicksands. Ras Alluglea is a rocky point extending to the north-west, and behind it is Jebel Ziguia, 727 feet high. This part of the coast is uncultivated and uninhabited. At 4½ cables north-eastward of the next point eastward of Ras Alluglea there is a rock with one foot water over it, and with a depth of 20 feet between it and the shore.

General charts 165, 2158a, 449.

Charts 252 and 250. Var. 9° 20′ W.

Fratelli rocks (Brothers) (*Lat. 37° 18′ N., Long. 9° 25′ E.*), 10 miles eastward of Cap Serrat, and 2 miles northward of Ras Alluglea, are two rocky islets, the eastern and larger, named by the Arabs El-Akwart-Kebar, is 302 feet high, and at a distance appears pyramidal, and at times like a sail; at its foot is a large cave, a reef extends 2 cables from it to the north-eastward, and a short distance in the same direction are two conical rocks.

The other islet named El-Akwart-Saghir is smaller, 131 feet above the sea, and separated from the former by a channel half a mile wide, with depths of from 25 to 35 fathoms. The islets are nearly 2 miles from the coast, and between there are depths of from 10 to 24 fathoms, over a bottom of sand and mud.

Shoals.—A shoal, with 2¾ fathoms water on it, lies about 6 cables north-eastward from the eastern Fratelli rock, and about 50 yards south-eastward of this shoal is another on which the depth is 3¼ fathoms; there are depths of 4 and 5 fathoms between the shoals.

The *red* sectors of Cap Serrat and Ras Engela lights show over Fratelli rocks and shoals.

Chart of Bizerta lakes on 1381.

Coast.—From Ras Alluglea the coast to Ras al Dukharra, 8 miles to the eastward, is formed of rocky cliffs, broken by ravines, without water, and bordered by rocks extending off a short distance; between the capes there is no direct communication with the interior; the Sidi Sala range, 2 miles inland, rises to 1,560 feet above the sea.

Ras al Dukharra, 16½ miles eastward of Cap Serrat, may be known by its ridge of serrated cliffs rising in steps from the sea; a shoal with 3¼ fathoms over it lies 1½ cables north-eastward of the cape. To the eastward of the cape is a small bay with a sandy beach, and a rocky flat at its head; on the eastern side of the bay, near the coast, is a guard-house.

Coast. — Between Ras al Dukharra and Ras al Koran, a distance of 6 miles, the coast is formed of small cliffs and rocks, broken here and there by sandy beaches through which several small streams enter the sea. Ras al Koran is a flat point of rocks and grey sandstone, off which are some rocks, the outer of which is awash and 3 cables northward of the point; as it is difficult to estimate the distance from the shore at night, these rocks are dangerous, and the point should be given a good berth. At 1½ miles eastward of the point a round, white tower is situated on a summit and conspicuous.

From Ras al Koran the coast consists of indented cliffs succeeded by a slightly elevated plateau, bordered by sandhills, and on one of these, westward of the plateau, is a small square tower in ruins;

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Chart of Bizerta lakes on 1381. Var. 9° 10′ W.

$1\frac{3}{4}$ miles eastward of Ras al Koran a rock lies about a third of a mile off-shore.

Ras Engela, the northern extremity of Africa, projecting to the north-east, terminates in rocks, and is foul to a quarter of a mile seaward. This part of the coast should not be approached too closely. Southward of the cape, Jebel Faia, 892 feet above the sea, has an old tower in ruins on its summit.

LIGHT (*Lat. 37° 21′ N., Long. 9° 44′ E.*).—From a white square tower, 49 feet in height, with a white dwelling attached, on the extreme of Ras Engela, near a ruined fort, a *flashing white* light, with a *red* sector, *every ten seconds,* is exhibited, at an elevation of 123 feet above the sea; it shows a *flash of two seconds* duration, followed by a total eclipse of *eight seconds,* and is visible in clear weather from a distance of 17 miles. For sector, *see* Light list and chart.

Chart 1569, Approaches to Bizerta.

Cap Blanc (Ras el-Labeit of the Arabs), situated 8 miles eastward of Ras al-Koran is high, with a round summit, and will also be known by a large white triangular patch; rocks extend about half a cable northward of it. The shore between Ras al-Koran and the cape is rocky with sandy beach.

Signal station.—Semaphore.—On a summit, 820 feet above the sea, half a mile south of Cap Blanc, there is a semaphore connected with Bizerta by telegraph; vessels can communicate by the International code. The station is also called Sémaphore de Bizerte. Call letters A.K.W.M.

Coast.—At a mile beyond Cap Blanc is Cap Guardia, the intermediate coast being high and steep. This latter cape is neither so high nor so steep as Cap Blanc, and the coast southward diminishes in height to the low land in the vicinity of Bizerta; shoal water extends off Cap Guardia, the 5-fathoms contour line being $3\frac{1}{2}$ cables northward of it, and in an east-south-east direction there is a shoal of $4\frac{3}{4}$ fathoms lying 3 cables from the cape. From Cap Guardia the coast turns abruptly to the southward, and for $1\frac{1}{2}$ miles, to the mouth of a small stream, is formed of small cliffs, bordered by flat rocks at the base of cultivated land and gardens.

Boberak bank (Banc de Sidi-Salem), about 2 miles southward of Cap Guardia, extends 4 cables from the shore, where there is a depth of 9 feet, and the 5-fathoms contour line from Cap Guardia, gradually increasing its distance from the shore, is here more than half a mile distant.

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Chart 1569, Approaches to Bizerta. Var. 9° 10′ W.

The rounded summit of Jebel Tuila (243 feet) open eastward of the Jetée Sud lighthouse, seen over the Jetée Nord, and bearing 181° true, leads to the eastward of Boberak bank.

Telegraph buoy. — A buoy with black and white horizontal stripes and marked "Télégraphe" lies southward of Boberak bank. It marks the submarine cable, and lies 9½ cables 345° true from the *occulting* light at the end of Jetée Nord. Vessels are prohibited from anchoring northward or westward of this buoy.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port of Bizerta are **earnestly requested** to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged. This fairway is limited as follows:—

On the south, by the alignment 250° true of the belfry on the barracks, which is very conspicuous, with the lighthouse (exhibiting an *occulting* light) on the Jetée Nord.

On the north, by the alignment 238° true of the same lighthouse with Bizerta steeple.

CAUTION. — Special attention to this notice is necessary for vessels using the Port of Bizerta.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

PORT OF BIZERTA (BENZERT) (*Lat. 37° 15′ N., Long. 9° 51′ E.*). — Extending from the Kasba or Citadel in an easterly direction is Jetée Nord, about 1,300 yards in length, and from a position 8½ cables south-eastward of the Kasba the Jetée Est extends northward, a distance of 1,000 yards, these two enclosing the entrance to Le Canal, which is cut through the spit of sand about 4 cables south of the Kasba; two piers, named Cavaliers, each about a cable in length, form the entrance to the canal.

A detached breakwater lies outside the two jetties and protects Le Canal; it is 660 yards long and extends parallel to the coast. The entrance between this breakwater and Jetée Nord is about 340 yards wide, and that between it and Jetée Est about 740 yards wide.

Vieux port, which originally was a natural canal communicating with the lake, is only available for small vessels drawing 8 feet water for a distance of about a third of a mile; it is entered south of the root of the Jetée Nord, and is marked by buoys.

Shoal.—A shoal, with depths of 1¼ to 2¾ fathoms, extends about 3½ cables eastward from the centre of Jetée Est.

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Chart 1569, Approaches to Bizerta. Var. 9° 10′ W.

Depths.—There is a least depth of 30 feet in the approach to Le Canal; a depth of 33 feet in Le Canal; 3¾ fathoms to 4½ fathoms in Baie de Sebra; 33 feet through the Rade Interieure; 5¼ to 7 fathoms in Le Goulet du Lac; 5 to 6 fathoms in Le Lac; and 2 to 5 fathoms in Port de Sidi Abdallah.

LIGHTS. — Jetée Nord. — An iron tower, 33 feet in height, with a masonry base, situated a cable within the Jetée Nord head, exhibits, at an elevation of 47 feet above the sea, an *occulting white* light *every five seconds*, which is visible in clear weather from a distance of 12 miles.

A *fixed green* light is exhibited, at an elevation of 28 feet above the sea, from a position 72 feet from the outer end of the jetty, and is visible in clear weather from a distance of one mile.

Jetée Est or Sud. — On the outer end of the Jetée Est a *fixed red* light is exhibited, at an elevation of 47 feet above the sea, and is in clear weather visible through an arc of 25° and from a distance of 6 miles.

Detached breakwater (*Lat. 37° 17′ N., Long. 9° 54′ E.*).—From the northern extremity of the detached breakwater is exhibited, at an elevation of 28 feet, a *fixed red* light (unwatched). This light should be given a berth of half a cable.

From the southern extremity of the same breakwater is exhibited, at an elevation of 38 feet, a *fixed green* light (unwatched). This light should be given a berth of half a cable.

Le Canal entrance. — At the entrance to Le Canal a *fixed green* light is shown from Cavalier Nord, and a *fixed red* light from Cavalier Sud: each light is exhibited from a small metal tower, 13 feet in height, at an elevation of 18 feet above the sea, and the *green* light is visible in clear weather from a distance of 3, and the *red* light from a distance of 5 miles.

Ras Sebra.—On the extreme of Ras Sebra an iron tower, 49 feet in height, exhibits, at an elevation of 48 feet above the sea, a *fixed* light which shows *red*, *white*, and *green* sectors, visible in clear weather from a distance of 3 miles. For sectors, *see* Light list and plan.

Le Canal.—From the Cavaliers, Le Canal runs in a north-easterly and south-westerly direction for a distance of 1,650 yards. It has a width of 250 yards and a least depth of 32 feet. A quay, 275 yards in length with 32 feet alongside, lies on the north side of the canal. Many pontoons also lie along the shore, and other quays and a large

General charts 1381, 250, 165, 2158a, 449.

Plan 1569, Approaches to Bizerta. Var. 9° 10′ W.

wharf are being constructed or are projected almost as far as Baie de Sebra.

On the southern side of Le Canal are coaling wharves.

Baie de Sebra, just inside Le Canal, lies between Ras Sellam on the north and Ras Sebra on the south; it is about 3 cables wide, half a mile deep, and in the middle there are depths of from 4 to 4½ fathoms, but it shoals some way from the head.

Small vessels may anchor here, and it is very convenient for the town, to which a good road runs. Dredging is in progress in the bay.

Beacons. — Three beacons at the head of the bay show the line of the middle of the bay.

Buoys.—A black buoy marks the edge of the shoal water northward of Ras Sebra, and another buoy of the same description lies about 1½ cables westward of it. A red buoy marks the edge of the shoal water southward of Ras Sellam. There are three mooring buoys, numbered 1 to 3, in the bay.

Anchorage.—Vessels should anchor in the middle of the bay, in 4 fathoms, on the line of the leading beacons, and midway between Ras Sebra and Pointe de l'Hopital.

Rade Interieur (*Lat. 37° 15′ N., Long. 9° 51′ E.*).—The inner road is situated between Le Canal and Goulet du Lac. Dredging is in progress there.

Buoys.—A red buoy is moored in 5 fathoms on the north-western side of the junction of Le Canal and Rade Interieure; two black buoys are moored on the south-eastern side, the northern one in 6 fathoms and the southern in 5 fathoms. The three buoys are each surmounted by a ball, in which is fixed a light, which is lighted when the mail steamer is moving in Baie de Sebra.

Goulet du Lac. — From Ras Sebra to Ras el Krem, 1½ miles to the westward, the north shore of Le Goulet is low, covered with olive trees, and bordered by banks, which, southward of Sidi Salah marabut, extend nearly 3 cables from the shore to the 5-fathoms line. The south coast is more elevated than the north, and is formed of steep, rocky cliffs, with, from the last mile, 5½ fathoms of water at a distance of half a cable from the rocks, and here is the anchorage for large vessels.

Shoals.—Banc de Sidi Salah, on the northern side of Le Goulet, extends about 3 cables south-eastward of Pointe de l'Amirauté, Baie Ponty, and has 1½ fathoms over it.

A small gravel patch, with a least depth of 3 fathoms over it, lies about 1¾ cables north-eastward of Ras el Krem, and a large bank

Plan 1569, Approaches to Bizerta. Var. 9° 10′ W.

of gravel, very steep-to, extends westward for a distance of 8 cables from Pointe de la Carriere, blocking about two-thirds of the head of Le Goulet, and leaving a channel, 330 yards wide, with a depth of 5½ to 7 fathoms, between it and Ras el Krem. The bank is named Barrage des Pecheries from the fish weirs that are established along it.

Many rocky heads, near the surface of the water, lie about 1¼ cables from the shore in the bight southward of the entrance to Le Goulet.

Beacon (*Lat. 37° 15′ N., Long. 9° 51′ E.*). — A white beacon, composed of blocks of concrete, and surmounted by a mast 20 feet in height, with a cylindrical topmark, is situated half a cable eastward from Ras Sebra.

Light-buoys.—A red buoy with a conical topmark, and exhibiting a *green fixed* light, is moored in 5¼ fathoms on the edge of the bank eastward of Ras Sebra.

A similar buoy, also exhibiting a *green fixed* light, is moored in 5¼ fathoms on the edge of Banc de Sidi Salah.

Buoys. — On the northern side of Le Goulet, besides the light-buoys, are two red buoys, one in 4¼ fathoms, about a cable southward of Ras Sebra, and the other on Banc de Sidi Salah is moored in 1½ fathoms over the base of the beacon that used to be there.

On the southern side of Le Goulet are two black buoys to mark the edge of the shoal water.

Mooring buoys. — One trunk buoy, No. 14, and three cask buoys, A, B, and C, for mooring small vessels, lie on the 5-fathoms line between Ras Sebra and Pointe de l'Amirauté. Fourteen mooring buoys lie on the south side of Le Goulet, below Ras el Krem, for mooring large vessels, and there are five mooring buoys, numbered 0 to 4, off the south point of Baie Ponty.

Baie Ponty, or Anse Amirauté, lies about 9 cables south-westward of Ras Sebra. The Admiralty lies on the northern point and the Naval hospital on the southern point. The bay is entirely reserved for the use of French war vessels. Six iron jetties, about 120 feet long, for the use of torpedo boats, are situated near the head of the bay, and four longer wooden ones for general use lie further out; the southern and longest one is the coaling jetty.

Lights. — A *fixed green* light is exhibited from near the end of Jetée de l'Amirauté. This light, in line with a *white* light on the shore, bearing 13° true, leads in 2¼ fathoms southward of the bank off Pointe de l'Infirmerie.

A *fixed red* light near l'Infirmerie, at the south-west of the bay.

A *fixed green* light on the western quay.

Two leading lights, the outer *fixed green*, on the north quay, and about a cable northward of the preceding light; and the inner a

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Plan 1569, Approaches to Bizerta. Var. 9° 10′ W.

fixed red light, 120 yards north-westward of it. These two lights in line bearing about 323° true lead into the bay in 2¼ fathoms, and westward of the rocks extending from the south-eastern point of the bay.

All these lights are not to be absolutely depended upon, particularly in bad weather and during the last hours of the night.

For arc of visibility, *see* Light list.

Light-buoy.—A red buoy, with a conical topmark, and exhibiting a *green fixed* light, is moored in 2 fathoms on the edge of the bank, about three-quarters of a cable south-westward of Pointe de l'Amirauté.

It is dangerous for vessels drawing more than 6 feet to pass to the northward of this buoy.

Buoys.—Four small conical red buoys are moored, in 2 fathoms, on the northern side of the bay, and there are five trunk buoys for small vessels moored on the leading mark into the bay.

Floating docks.—There are some small floating docks in Baie Ponty.

Baie de Seti Meriem (*Lat. 37° 15′ N., Long. 9° 50′ E.*) lies westward of Baie Ponty, between Pointe de l'Infirmerie and Ras el Krem; it is reserved for submarines.

Two small mooring buoys, marked D. P., and for the use of port officials, lie in the bay.

Two conspicuous landmarks in this bay are the large chimney of the electric station and the waterworks.

Plan of Lake Bizerta on 1381.

Channel between Goulet du Lac and Le Lac.—The entrance to the channel is between the end of Barrage des Pecheries and Ras el Krem, a distance of 330 yards. Baie Karuba lies just inside the entrance to the channel, westward of Ras el Krem, and has depths of 3¼ to 5 fathoms in the middle, but it is of small extent. This is the general anchorage for fishing vessels. On the northern side of the channel westward of Baie Karuba are two low islands named Srira and Dzira-el-Kbira; the former, about half a mile westward of Barrage des Pecheries, is small, and has a bank awash extending from it to the southward for a distance of about a cable. Dzira-el-Kbira, about 1½ miles long, in a north-easterly and south-westerly direction, has a bank extending 3½ cables eastward of Pointe du Duar, its north-eastern extreme.

On the southern side of the channel the peninsula of Abder Rahman terminates in Ras Shra and Ras Keblaoui, two rocky points off which shoal water extends for a distance of one and 1½ cables. These points and Dzira-el-Kbira form the southern end of the channel and the entrance to Le Lac, with a navigable width of about 1½ cables.

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Plan of Lake Bizerta on 1381. Var. 9° 10′ W.

Between Ras Shara and Barrage des Pecheries is Baie des Carrieres, on the southern shore of which is a high rocky nipple, 102 feet high, surmounted by a pyramid. The bay has a general depth of 6 fathoms, and the shoals off the shore are generally rocky.

Depth.—In the channel there is a depth of 5½ to 7 fathoms.

Beacons. — A white beacon, with a triangular topmark, is situated on the north-western point of Île Srira, and another on the mainland abreast the northern point of the island. A white beacon with a conical topmark is situated one-third of a mile north-eastward from Point du Duar, at the end of the bank extending from the point.

Buoys. — A black buoy, with a cylindrical topmark, lies in 6 fathoms about half a cable south-westward of the end of Barrage des Pecheries.

A black buoy, with a cylindrical topmark, lies in 5 fathoms on the edge of the bank extending south-westward of Barrage des Pecheries, 1½ cables south-westward of the end.

A red buoy with a conical topmark lies in 6 fathoms about 1½ cables south-eastward of Pointe Karuba, and marks the edge of the shoal water off that point.

A red buoy with a conical topmark lies in 5 fathoms three-quarters of a cable south-eastward of the southern extreme of Île Srira, and marks the edge of the bank.

A black buoy with a cylindrical topmark lies in 5½ fathoms about 2 cables north-westward of Ras Shara.

A red buoy with a conical topmark lies in 5½ fathoms about 3½ cables south-eastward of Pointe du Duar, and marks the edge of the bank off Dzira el Kbira.

A black buoy with a cylindrical topmark lies in 6 fathoms about 1½ cables west-south-westward of Ras Shara.

A black buoy with a cylindrical topmark lies in 6 fathoms about 1¾ cables south-westward of Ras Keblaoui.

The last seven buoys described are fitted with lights, which will be exhibited on application being made to the Director of the port (Baie Ponty). The red buoys will exhibit a *green fixed* light and the black buoys a *red fixed* light. The lights will be visible from a distance of about 2½ miles.

Le Lac (*Lat. 37° 13′ N., Long. 9° 50′ E.*), almost circular, and about 20 miles in circumference, has a space about 3½ miles long and from 2 to 2½ miles wide, with depths of from 5 to 6 fathoms. The northern shore is steep-to near Ras Krabeuch, and there is a depth of 5 fathoms about a cable from the coast. From Ras Krabeuch to Menzel Abd-er-Rahman and on to the village of Menzel Jemil a bank runs out into the lake, and between the two villages there is a depth of 2¾ fathoms about a mile from the shore. The eastern shore from

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Plan of Lake Bizerta on 1381. Var. 9° 10′ W.

Menzel Jemil to Ras Wali is safe, and the depths regular; 2½ fathoms will be found about 2 cables from the shore. The southern shore is less steep, and off Pointe Kociene some sunken blocks of free-stone lie out a distance of 3½ cables from the point. Blocks of the same material also lie off Pointe Tanjani, and are evidently the remains of the ancient quays. Between Pointe du Caid and Pointe Tanjani a bank runs out for about 7 cables, and between the mouth of Wadi Tinsha and the southern point of Dzira el Kbira, on the western side of the lake, a bank runs out nearly 1½ miles from the shore.

Port de Sidi Abdallah (*Lat. 37° 10′ N., Long. 9° 51′ E.*).—This artificial port is enclosed by a northern jetty which runs out eastward from Pointe du Caid, a distance of 500 yards, a southern jetty about 600 yards long, and an eastern one about 1,000 yards long. The entrance, 100 yards wide, is in the north-eastern corner. A channel dredged to a depth of 32 feet leads into the basin. There is a depth of 13 feet alongside the north and south quays, 13 to 16 feet alongside the east jetty, and 30 feet under the big crane on the west quay.

There are two coaling jetties, each about 170 yards long, with a railway on each, which are reserved for vessels of war, and three others about 50 yards long. There is an electric crane of 120 tons, all the resources of a large arsenal, and three dry docks, for particulars of which *see* Appendix I.

Port des Explosifs.—A small port reserved for explosives lies eastward of Pointe Tanjani, about three-quarters of a mile north-westward of the Arsenal. It is about 180 yards long, 90 yards wide, and has an entrance from the south-eastward 16 yards wide, with a depth of 10 feet.

Lights.—A *fixed red* light is exhibited from the extreme of the southern jetty, at the entrance to Port de Sidi Abdallah, and a *fixed green* light from the extreme of the northern jetty.

Light-buoy.—A red light-buoy, exhibiting a *green fixed* light, is moored, between Le Goulet and Sidi Abdallah, in 5 fathoms, about 1½ miles southward of Ras Keblaoui.

Buoys.—An ordinary mark buoy is moored 2$\frac{6}{10}$ miles south-south-eastward of Menzel Abd-er-Rahman. Two small buoys are moored in the entrance to the dredged channel to Sidi Abdallah, about 2 cables from the entrance to the port.

Chart of Bizerta lakes on 1381.

Lac de l'Ishkel.—About 2 miles westward of Le Lac, and connected by the Wadi Tinsha, narrow and winding, is Lac de l'Ishkel, which is nearly 8 miles in length east and west, and 3 miles in breadth

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Chart of Bizerta lakes on 1381. Var. 9° 10′ W.

north and south, with 3 to 8 feet water; it takes its name from an insular hill upon its south side, elevated 1,625 feet above the sea, at the south-eastern foot of which are some hot springs.

The water of this lake is nearly fresh during winter, but in summer, when its level sinks, it receives an overflow from Le Lac, which is salt. Considerable quantities of fish, chiefly mullet and eels, are here procured for the Tunisian market.

Plan 1569, Approaches to Bizerta.

Pilots. — Pilotage is free and compulsory for Le Canal, but nevertheless all vessels of war of over 150 tons must pay 15 francs for the passage. The pilotage ceases to be free if vessels call the pilot from outside the limits of the port. The pilot station is near the Cavalier Nord.

Tides.—It is high water, full and change, at Bizerta, at VIIIh. 20m.; springs rise 1¼ feet, neaps rise half a foot; strong westerly winds raise, and similar easterly winds lower, the level about half a foot.

Tidal streams.—The tidal streams in Le Canal attain rates of from 3 to 4 knots at springs, to 2 to 3 knots at neap tides, and generally turn at 3h. 15m. after, and 3h. 45m. before, high water, but this movement may be advanced or retarded by the wind prevailing at the time.

Tidal signals. — During the day, signals are made to indicate the direction of the streams from the yardarm of the flagstaff at the pilot station on the north side of the entrance.

A black pennant, over a black ball, indicates that the stream is running in.

A black pennant, under a black ball, indicates that the stream is running out.

Absence of any signal indicates slack water.

A red flag with a white border indicates that Le Canal is obstructed.

Anchorages. — Rade Exterieur (*Lat. 37° 16′ N., Long. 9° 53′ E.*).—The outer anchorage, in about 8 fathoms of water, is about 2 cables northward of Jetée Nord *occulting* light, but the holding ground is bad.

Avant port. — Vessels may anchor in l'Avant port, and should do so off the entrance to Vieux port and as near as possible, for swinging room, to the Jetée Nord. Here they will not interfere with vessels entering or leaving Le Canal, be out of the current, and well protected, but the space is very limited and there is not room for more than two vessels at a time.

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Plan 1569, Approaches to Bizerta. Var. 9° 10′ W.

Rade Interieure.—Anchorage may be taken up anywhere in Le Goulet, over mud, between Ras Sebra and Barrage des Pecheries, avoiding the moorings.

For anchorage in Baie de Sebra, *see* page 425.

Plans 1569 and 1381.

Signals prohibiting entry to port.—The signals adopted for prohibiting entry into the Port of Bizerta are those of Series A, *see* page 65.

Directions. — Entering Le Canal by day, when inside the detached breakwater, Ras Sebra lighthouse should be kept bearing 234° true; this will lead through the centre of Le Canal. The speed is to be only sufficient to keep the vessel under control. The set of the tidal stream (which is indicated by signal, *see* page 430) must be considered when entering. Anchoring in Le Canal is prohibited.

If intending to proceed into Le Goulet, when 4 cables from Ras Sebra, and having passed between the black and red buoys moored at that distance, steer 203° true to pass midway between the red light-buoy off Ras Sebra and the black buoy on the east side, and when Ras Sebra bears 304° true steer 234° true along Le Goulet, passing about a cable southward of the red light-buoy marking the extreme of the shoal extending south of Sidi Salah marabut.

If proceeding seaward from Le Goulet, a black vertical stripe painted on the western face of the detached breakwater, bearing 54° true, kept ahead, leads through the centre of Le Canal.

If entering Le Lac, when south of the light-buoy, bring the white beacon on Île Srira a little to the northward of the end of the Barrage des Pecheries, off Pointe de la Carriere, bearing about 252° true.

After passing the Barrage des Pecheries two black buoys eastward of the channel should be left, close to, on the port hand, and the red buoys marking the extreme of the shoal extending from Ras Karuba and southward from Île Srira, left on the starboard hand about half a cable distant. The course is then to pass westward of the black buoy lying north-westward of Ras Shara, and between the red and black buoys westward of Ras Shara; after which leave the black buoy south-westward of Ras Keblaoui on the port hand and shape course for the anchorage required or Port de Sidi Abdallah if proceeding there.

At night.—Entering Le Canal at night, when inside the detached breakwater, keep in the *white* sector of Ras Sebra light, bearing about 234° true, observing that it shows *green* to the northward and *red* to the southward of about this bearing. For permanent lights on buoys and temporary lights on buoys, *see* pages 425-428.

General charts 250, 165, 2158a, 449.

Plan 1569, Approaches to Bizerta. Var. 9° 10′ W.

Town.—The town of Bizerta (Benzert), the ancient Hippo Zaritus, lies along the coast on the northern side of the canal; it has increased very largely since the improvement of the port, and in 1910 had a population of 25,000. A British Vice-Consul is resident there.

Communication.—Three steamers leave weekly for Tunis; direct communication once a week with Marseille; weekly communication with Naples and Genoa, calling at Cagliari, and weekly with Algiers and Algerian ports. Railway communication with the main line through Algeria; telegraphic communication with all parts. *See* also page 18.

Submarine telegraph cable.—There are cables to Marseille, Bona, and Tunis.

Coal and supplies.—About 17,000 tons of coal and patent fuel are kept in stock in Government hands and 7,000 by private firms; coaling is carried on by baskets, and 10 lighters, each holding 100 tons, are available; 400 tons could be put on board in 24 hours. There is a coal wharf, 2,500 feet in length, and with a depth of 34 feet alongside. There is a berth alongside Jetée Sud for taking in liquid fuel, of which about 6,000 tons is kept in stock.

Vessels requiring coal quickly should hoist flag N of International code under their numbers when passing the signal station at Cap Blanc or Cap Bon.

Supplies of fresh provisions may be obtained in abundance, and good water procured from the quay, and from floating tanks.

Docks.—There are three dry docks at the Arsenal Sidi Abdallah, and some small floating docks at Baie Ponty. For particulars, *see* Appendix I.

Life-saving station.—A lifeboat and a rocket apparatus is maintained in the port.

Repairs.—There is a workshop where some repairs might be effected, and a crane which will lift 30 tons. *See* also Sidi Abdallah, page 429.

Hospital.—The naval hospital at Baie Ponty has accommodation for 90 patients, and is being enlarged.

Shipping.—During the year 1910 the port was entered by 320 steam, and 289 sailing, vessels with aggregate tonnages respectively of 310,002 and 8,968 tons.

Chart 250, Fratelli rocks to Mahedia.

Ras Zebib (*Lat. 37° 16′ N., Long. 10° 5′ E.*).—The bay between Cap Guardia and Ras Zebib has a sandy beach, at 2 cables from which there are 3 or 4 fathoms water. Bizerta stands on the lowest part of the coast, which thence gradually rises to Ras Zebib. Jebel Kshapta, 13 miles to the south-west of Ras Zebib, and near the southern shore of Le Lac, rises 1,365 feet above the sea.

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Chart 250, Fratelli rocks to Mahedia. Var. 9° W.

Ras Zebib, the eastern extreme of Bizerta road, has two cones 312 feet high, is salient, resembles Cap Blanc, and is backed by elevated land; it is surrounded at a short distance by rocks, and near the extremity of the cape are some houses. *See* view on chart.

Tunny fisheries.—Tunny nets are laid out during the season, 1st April to 1st July, between Ras Zebib and the west point of Île Plane; they extend seaward for a distance of 3 miles. For Lights, marks, and caution, *see* page 73.

Plan of Cani rocks on 250.

Cani rocks, 5 miles north-north-eastward from Ras Zebib, consist of two islets scarcely separated, extending 6 cables in a north-easterly and south-westerly direction, with outlying rocks and shoal patches. The larger islet is about 65 feet high, covered with large boulders of hard and brittle stone, probably a chalky limestone, and on its south side is a landing place.

Sunken rocks extend a cable off the north-east end, and from the same part of the island a ledge, on which there are depths of from $3\frac{1}{2}$ to 6 fathoms, extends a mile to the north-eastward; the 10-fathoms contour line is $1\frac{4}{10}$ miles north-east of the island.

The smaller islet is round, and from it a bank, with general depths of $3\frac{1}{4}$ fathoms, extends half a mile in a southerly direction; 2 cables southward of the islet are two smaller ones, 5 feet high, and shoals, with $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms water over them, extend 2 cables north and south of these islets.

The bank on which these islets lie is further extended, in a southerly direction, for a distance of 7 cables to the 10-fathoms line, and on it are South shoal with 16 feet water over it, situated $8\frac{1}{2}$ cables south-westward from the lighthouse of Cani rocks; and a shoal of $4\frac{3}{4}$ fathoms on the same bearing distant $1\frac{2}{10}$ miles from the lighthouse. These dangers cannot readily be seen, owing to the dark colours of the weeds by which they are covered. Vessels passing through the channel between Cani rocks and the mainland should give a good berth to both these shoals; in mid-channel there is 24 fathoms water. On the extensive bank westward of the islands is a coral fishery.

There is no fresh water on the islets.

LIGHT (*Lat. 37° 21′ N., Long. 10° 7′ E.*). — On the summit of the highest of Cani rocks a white circular tower, 70 feet in height, and situated at the angle of a dwelling, exhibits, at an elevation of 129 feet above the sea, a *group flashing white* light *every ten seconds:* it shows *two flashes* in quick succession, thus:—flash, about *one-tenth second;* eclipse, *two and four-tenths seconds;* flash, about *one-tenth*

General charts 165, 2158a, 449.

Plan of Cani rocks on 250. Var. 9° W.

second; eclipse, *seven and four-tenths seconds;* and in clear weather is visible from a distance of 17 miles. *See* view on chart.

Chart 250, Fratelli rocks to Mahedia.

Banks. — About 5 miles north-eastward of Cani rocks is a small coral bank with 17 fathoms over it, and 3½ miles westward of the rocks is a circular bank, about three-quarters of a mile in diameter, and a least depth of 12 fathoms rock. This last bank should be avoided in bad weather.

Coast.—To the south-eastward of Ras Zebib the coast is low, with some cliffs and small beaches, bordered, for the first part by sandy hillocks; behind these is a cultivated plain, in the centre of which stands the large village of Ras el Jebel, eastward of which wooded hills extend to Jebel Nadur. Some rocks, covered and uncovered, lie off this coast, distant 1½ cables from it.

The several guard-houses, the minarets of the village, and two remarkable cones, 393 feet high, are marks on this part of the coast. *See* view on sheet 1381.

Plan of Cape Farina anchorage on 1381.

Ile Pilau (*Lat. 37° 12′ N., Long. 10° 14′ E.*), 2 miles to the north-westward of Cap Farina, and separated from the mainland by a channel 6 fathoms deep, is 377 feet high. Its base is long and narrow, but the centre is a large rocky cliff, which from the northward appears like an inclined pyramid, and has been mistaken for a vessel under sail. *See* view on plan.

Cap Farina (Ras Sidi-Ali-el-Mekki of the Arabs) is the termination of an arm of land which proceeds from a chain of mountains rising near Bizerta lake, and trending eastward, becomes less elevated in proportion as it advances towards the cape, which descends to a low point surrounded by shallow water. Jebel Nadur, the apex of the ridge, and a mile from the northern shore, is 1,070 feet high. On the summit of the cape is a building. *See* view on plan.

Signal station.—Semaphore.—A semaphore, established on Jebel Nadur, consists of a white round tower 31 feet in height, and with a dwelling attached. The semaphore mast, on a platform outside, is 49 feet in height, has as a distinctive signal the letters A K W I of the International code, and is in telegraphic communication with Bizerta.

Ile Plane (El Kamela), lying 2 miles eastward of the cape, is about 29 feet high, level, barren, and surrounded by a reef. The channel between the islet and the cape has deep water, but, in addition to the reef mentioned, is obstructed by several shoal heads, with 16 and 20 feet water over them, the positions of which will be better

Plan of Cape Farina anchorage on 1381. Var. 9° W.

understood by a reference to the plan. It is better to pass outside Île Plane, but vessels obliged to use this channel are recommended to pass close to the cape. The two cones, previously mentioned, open north of Île Pilau, bearing 271° true, lead to the northward of these shoals.

LIGHT (*Lat. 37° 11′ N., Long. 10° 19′ E.*).—A lighthouse, consisting of a square tower, 39 feet in height, above a square building, stands on Île Plane, and exhibits, at an elevation of 65 feet above the sea, a *fixed red* light with a *green* sector. It is visible in clear weather from a distance of 10 miles. For sector, *see* Light list and chart.

Anchorage. — South of Cap Farina is the best anchorage in the Gulf of Tunis, in 6½ fathoms water one mile south-westward of the point or closer in for a small vessel in a depth of 4 fathoms. The holding ground is very good and the anchorage protected except from E.N.E. and East.

Porto Farina. — From Cap Farina the coast trends in to the south-westward for 4 miles, thence for about 2 miles south-eastward to Ras Taluad, forming a bight named Marsa Adrea. Over the flat shore is the entrance to a lagoon about 12 miles in circuit named El Bahira or Lac de Porto Farina, communicating with others on both sides near the shore. The lagoon has a depth of from one to 3 feet, and can only be used by boats. On the north shore of the lagoon is the town of Rhar el Mela or Porto Farina.

At the low point of Ras Taluad is the mouth of the Wadi Mejerda, the principal river of Tunis. It is said that the bank of sand and mud off the entrance is constantly advancing seaward.

Communication. — There is a telegraph station at Porto Farina.

Supplies. — There is a road to the town of Tunis, and some supplies might be procured.

Chart 250, Fratelli rocks to Mahedia.

GULF OF TUNIS. — This gulf is about 27 miles deep, and its entrance, between Cap Farina on the west and Cap Bon on the east, is 37 miles wide, and includes Île Plane, just described, and the precipitous island of Zembra, 11 miles westward of Cap Bon; the gulf is entirely open to north-easterly winds.

The upper part of the gulf beyond Cap Carthage and Cap Zafran is somewhat in the form of a horseshoe, and is generally known as Baie de Tunis, at the head of which is La Goulette and the city.

In the southern part of the gulf Jebel Bu Kurnin and Jebel Résas are 1,887 and 2,608 feet high respectively, and in clear weather Jebel

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Chart 250, Fratelli rocks to Mahedia. Var. 9° W.

Zaghwan (4,078 feet), situated 24 miles to the southward, may be seen; more to the eastward, and separated by the plain of Soliman, Jebel Sidi Abder Rahman is 2,100 feet high.

Depths off-shore.—The greatest depths across the entrance are from 60 to 70 fathoms, the bottom being of mud and clay; along the eastern shore, 10 fathoms will be found at about a mile off, but on the western, and in the Baie de Tunis, the same depths are from 3 to 5½ miles out, including, upon the south-east side of the latter, some rocks more than a mile off.

Cap Kamart (*Lat. 36° 56′ N., Long. 10° 20′ E.*), 16 miles southward of Cap Farina, is formed by a reddish cliff, 66 feet above the sea; the intermediate land, or plain of Mejerda, is chiefly low, cultivated, and marshy, with three large salinas or salt lakes. The coast, forming a deep bay with a sandy beach, should be approached by the lead, not nearer than a mile. Three cables north-eastward of Cap Kamart there is a rocky head with about 17 feet water over it.

El Marsa. — Southward of Cap Kamart, and between it and Cap Carthage is a small bay named El Marsa, on the shore and in the interior of which are numerous houses and gardens, the residences of the various consuls and of wealthy Tunisians. Several kiosks and public and private bathing houses are built on the rocks on the borders of the sandy beach. The anchorage off the beach is not good.

Communication.—There is a railway station at El Marsa, and communication by rail with La Goulette and Tunis.

Plan 1184, Bay and Lake of Tunis.

Cap Carthage (Ras Bu-Said of the Arabs), *see* view, page 446, situated 3 miles south-eastward of Cap Kamart, is a bluff 410 feet high, terminating in rocky points, which from the anchorage of Farina appears isolated. On the summit of the cape is the new town of Sidi-bu-Said, to the west and south of which, for a distance of about 2½ miles, is a plain, on which are the remains of Byrsa, the citadel of ancient Carthage, with a multitude of other ruins of this once celebrated city. Carthage was principally built along the coast of the peninsula to the north-eastward of Tunis, from a little north of La Goulette de Tunis to Cap Carthage, and then round to Cap Kamart. It was defended on the land side, where it was most open to attack, by a triple line of walls of great height and thickness, flanked by towers, that stretched across the peninsula from the Lac de Tunis to the sea on the north. Having less to fear from attacks by sea than by land, the city had on the sea side only a single wall. A

Plan 1184, Bay and Lake of Tunis. Var. 9° W.

museum of Carthaginian and Roman antiquities has been established in the old Beylical Palace of the Bardo, 5 miles from Tunis.

About 10 and 13 miles westward of Cap Carthage are Jebel Nahali and Jebel Jepselian, two isolated mountains, rendered remarkable by two peaks, the eastern being 928 feet and the western 1,115 feet high, which with the cape are good marks. The mountains from the northward appear as two paps.

LIGHT (*Lat. 36° 52′ N., Long. 10° 21′ E.*).—On the summit of Cap Carthage a white cylindrical tower, 39 feet in height, exhibits, at an elevation of 482 feet above the sea, a *flashing white* light *every twenty seconds*, showing a *flash* of *three and a half seconds* duration, followed by an eclipse of *sixteen and a half seconds;* it is visible in clear weather from a distance of 20 miles. Reported irregular.

Signal station.—On Cap Carthage, at the lighthouse, is a signal station with which vessels can communicate by the International code. The call letters are A.K.W.G.

BAIE DE TUNIS (*see* view, page 446). — From Cap Carthage the coast, nearly straight in a south-westerly direction for 4¼ miles to La Goulette de Tunis, is bold and steep near the cape, but becomes gradually lower with a sandy beach, to the southward. At one mile from the cape is a small white fort named Burj Jedid, and at 1¾ miles, at the termination of a ridge, is the conspicuous chapel of St. Louis, and a little beyond it a small lake, the ancient port; though this part of the land is strewed with the ruins of ancient Carthage very little of them is seen from the sea.

Depths off-shore. — The coast may be approached by the lead, the bottom being even, the 5-fathoms contour line passing close to Cap Carthage, gradually advances, and off La Goulette it is about 2 miles from the shore, and the 10-fathoms line is about 6 miles from the head of the bay.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairways reserved for traffic. — When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave Port de Tunis are **earnestly requested** to make use of the fairways, defined below, in which submarine vessels are prohibited from exercising submerged. These fairways are limited as follows:—

Zone 1.—On the west, by a line joining Cap Carthage and Ile Plane; and on the south by the line, St. Louis chapel, just open south of Cap Carthage, bearing 239° true.

Zone 2.—On the east by the alignment (329° true) of Cap Kamart and Cap Carthage.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 65.

General charts 165, 2158a, 449.

Plan 1184, Bay and Lake of Tunis. Var. 9° W.

Rade and Port de La Goulette.—The roadstead affords no shelter from winds from N.N.E. to E. by N., which winds blow with violence in the winter. South-easterly winds also bring in a troublesome sea. The holding ground is also not good. The entrance of Le Canal into Lac de Tunis is protected by Jetée du Nord, which projects southward from the north side of entrance about a quarter of a mile, and then south-eastward for a distance of 568 yards, Jetée du Sud, parallel to and 246 yards from the northern, is 656 yards in length. About half a mile inside the entrance, and on the northern side of Le Canal is a basin, 360 yards long, with a depth of 14 feet in the outer or canal side and 9 feet in the remainder. There is communication in it with the dock.

Depths.—There is a depth of 21 feet in the entrance to Le Canal; an average depth of 24 feet in Le Canal; and a depth of 21 feet in Bassin Principal and Bassin des Minerais at Tunis. Vessels of 20 feet draught can use the Bassins without danger; vessels of 21 feet draught are only taken in provided the captain takes all risks.

LIGHTS.—Jetée du Nord (*Lat. 36° 48′ N., Long. 10° 18′ E.*). —A white iron post, 31 feet in height, situated on the head of Jetée du Nord, exhibits, at an elevation of 40 feet above the sea, an unwatched *group flashing white* light showing *three* flashes *every ten seconds;* it is visible in clear weather from a distance of 11 miles.

On the inner end of the Jetée du Nord, 440 yards from the preceding light, there is an iron support, surmounting a white stone tower, the whole about 15 feet in height, which exhibits, at an elevation of 23 feet above the sea, a *fixed white* light which in clear weather is visible from a distance of 8 miles. For arcs of visibility of these lights, *see* Light list and plan.

Jetée du Sud.—On the head of Jetée du Sud a *fixed red* light is shown, at an elevation of 23 feet above the sea, from an iron support, on a white stone tower, the whole 16 feet in height, and is visible in clear weather from a distance of 6 miles. For arc of visibility, *see* Light list and plan.

Light-buoy. — A black buoy, exhibiting a *fixed red* light, is moored, in a depth of 3¼ fathoms, at the entrance to Le Canal, about one cable south-westward of the Jetée du Nord lighthouse.

Anchorage. — The anchorage in the roadstead is in about 5½ fathoms mud, according to a vessel's draught; the holding ground is not good, and vessels should lie with a long scope of cable. A good berth for a large vessel is in 6 fathoms water, with Harem baths in line with Burj Ben Hassan, bearing 258° true, and the lighthouse on Cap Carthage, 347° true. Small vessels lie closer in on the former

General charts 250, 165, 2158a, 449.

Plan 1184, Bay and Lake of Tunis. Var. 9° W.

of these marks in a depth of 4 fathoms. The anchorage affords no shelter from winds from N.N.E. to E. by N., which winds blow with violence in the winter.

Prohibited anchorage. — Vessels must avoid anchoring in the vicinity of the submarine cable, the position of which is indicated by the following beacons, painted blue and white in horizontal bands, and surmounted by circular discs: —

Front beacon, situated on eastern shore of isthmus at about one mile northward from the head of Jetée du Nord.

Rear beacon, situated 317° true, distant 150 yards from the front beacon.

These beacons in line, bearing 317° true, indicate the direction in which the cable is laid.

Town (*Lat. 36° 48′ N., Long. 10° 18′ E.*).—The town of La Goulette is situated on the sandy beach, and within the fortifications, which command the entrance to Lac de Tunis. The principal objects are the Clock tower, the Kasbah, and the Palais de Justice, a large round building.

Communication. — A small steamer runs several times a day between La Goulette and Tunis. La Goulette has railway communication with Tunis and El Marsa, also telegraphic communication with all lines. A submarine cable connects La Goulette and Marseille.

Coal and supplies. — About 1,200 tons of coal are kept in stock, and about 1,000 tons might be put on board in 24 hours; five lighters are available, but others could be obtained from Tunis. Supplies of fresh provisions may be procured, and good water in a tank vessel from Tunis.

Dock.—There is a dry dock at La Goulette; for particulars, *see* Appendix.

Repairs. — Metal castings are executed at La Goulette arsenal. A 20-ton floating crane is available.

Life-saving station. — A life-saving station is established at La Goulette, and a lifeboat is also maintained there.

Lac de Tunis is about 6 miles long, east and west, and 2½ miles north and south, or from 18 to 20 miles in circumference, with low marshy shores and shallow water throughout; the general depth is about 3 feet, the greatest depth being under 6 feet, over a bottom of sand and mud. Off the north-west shore is Îlot Shikli, on which are the buildings of the lazaretto. At the end of Le Canal are the basin, arsenal, barracks, &c., which are walled in.

Le Canal de Tunis. — The entrance channel, nearly a mile long and 109 yards wide, is dredged to a depth of 21 feet at low

Plan 1184, Bay and Lake of Tunis. Var. 9° W.

water. From La Goulette as far as the town of Tunis, a distance of $4\frac{4}{5}$ miles, a channel, Le Canal, 98 feet wide, with an average depth of 24 feet water, has been dredged. A gare or siding, 590 yards long, and 60 yards wide, is situated nearly midway.

A steam ferry boat establishes communication between the sides of the channel.

Port de Tunis (*Lat. 36° 48′ N., Long. 10° 12′ E.*).—At Tunis, Le Canal opens into a basin, Bassin Principal, 436 yards in length, 328 yards in width, and having a depth of 21 feet. The western and southern sides are bordered by quays, which vessels can go alongside. There are many mooring buoys off the quays for berthing vessels.

There is a quayage space of 1,875 feet, which is being extended. There is a 20-ton floating crane, and several smaller ones on the quays.

Southward of the extremity of Le Canal is Bassin des Minerais, which is the principal coaling basin, and has a depth of 21 feet. At the northern end of Bassin des Minerais is Bassin des Voiliers, a small basin, which is reserved for sailing vessels; there is a depth of from 15 to 21 feet in it, and there are three iron jetties on the western side, each about 100 feet in length.

Vessels of 20 feet draught can use the two principal basins with safety. Vessels of 21 feet draught can only be taken in providing the captain takes all risks. The bottom of Le Canal and the basins is mud throughout, so many vessels ground without damage.

Le Canal lights. — Upon a platform on the north side of the channel, a little westward of the basin at La Goulette, a *fixed white* leading light is shown, lighting only the axis of the channel westward.

Upon the north and south banks of the channel, at 30 yards from the edges, are six pairs of lights, the north lights *white* and the south *red*, namely two pairs in the entrance at La Goulette, one pair near the west extremity of the entrance channel, two pairs—one on either side of the gare, which are unwatched—and one pair at the entrance of Bassin Principal, Tunis.

At the head of the Bassin Principal, Tunis, is a *white* leading light lighting only the axis of Le Canal eastward.

Buoys are moored in pairs marking the sides of Le Canal; these pairs, in the entrance channel, are 2 cables apart; in the curve one cable; through Le Canal $2\frac{3}{4}$ cables; and in the port three-quarters of a cable apart.

Entrance signals.—Signal masts are placed at La Goulette, at the gare and at Tunis; they are each connected by telephone.

When entrance to Le Canal is prohibited the following signals will be hoisted at the yardarm of the pilots' flagstaff at La Goulette.

General charts 250, 165, 2158a, 449.

Plan 1184, Bay and Lake of Tunis. Var. 9° W.

A red flag by day or a *red* light by night indicates that entrance to Le Canal is temporarily prohibited.

Two red flags by day, or two *red* lights by night, that entrance is prohibited.

The absence of signals indicates that the channel is free between La Goulette and Tunis.

Dredger signals.—When a dredger is at work in Le Canal or the basins she will show the following signals:—By day, a flag with red and white stripes; by night, a *white* light vertically over a *red* light signifies the channel is clear, proceed as slowly as possible. By day a red flag on a white ground, framed in blue; by night a *red* light, signifies the channel is not clear, the dredger is not in the siding.

Pilotage is compulsory for all vessels above 25 tons.

Directions. — Sailing vessels bound for Tunis should, especially in winter, and when the weather is misty, make sure of their position, as there is little room to manœuvre should it come on to blow from the north-east; the currents, it must also be remembered, which generally set to the east, are much influenced by the wind. Vessels coming from the east, with easterly winds should pass between Zembra and the coast, keeping under the land to be sheltered from the sea; the wind often freshens and becomes scant as the vessel proceeds into the gulf.

Vessels waiting for a pilot should stop eastward of the Jetée du Nord lighthouse. The port regulations limit the speed to 6 knots an hour when passing through Le Canal, and vessels with twin screws should keep in the middle, particularly at night, to avoid fouling the blades in the mooring chains of the buoys, by keeping the *white* light, at the head of Bassin Principal, Tunis, mid-way between the *red* and *white* on the sides of Le Canal.

Anchorage in Le Canal, unless in cases of urgent necessity, is prohibited, but outgoing vessels must leave a free passage for those entering and if necessary moor to allow the latter to pass, and when moored, in lieu of the masthead light *two red* lights must be hoisted.

City (*Lat. 36° 48′ N., Long. 10° 12′ E.*). — Tunis, ancient Tunes. the city and capital of the regency, is situated on the western shore of the lake, and surrounded by walls 5 miles in circuit, with several forts in commanding positions. It presents an imposing and picturesque appearance from the sea, the buildings being of dazzling whiteness, but the houses are low and the streets narrow. The population is estimated at 200,000, of

Plan 1184, Bay and Lake of Tunis. Var. 9° W.

which 25,000 are Europeans, 30,000 are Jews, and 145,000 Mohammedans. A British Consul-General and Vice-Consul reside at Tunis.

Communication.—Three steamers leave every week for Marseille; twice a week steamers leave for Algiers; weekly steamers to Bizerta, Genoa, Malta, Naples, Pantellaria, Sicily, Sfax, Susa, and Tripoli, calling at intermediate Tunisian ports; fortnightly with Algerian and Morocco ports and Gibraltar. *See* also page 18.

Railway communication with the main line to Algiers, through Souk-el-Arba; with El Marsa and La Goulette; with Bizerta; with Golfe de Hammamet as far as Susa; with Kalaat-es-Senam, and several short branches from it; telegraphic communication with all lines. The telegraph office is open till midnight.

Coal.—About 300 tons of Welsh coal is kept in stock by Government; about 9,000 tons of coal and patent fuel by private firms. There are 120 lighters holding 25 to 100 tons, 20 of which are kept loaded; 600 tons could be shipped in 24 hours. There is a coal wharf 300 feet long, with a depth of 20 feet alongside at low water.

Life-saving station.—A rocket apparatus is maintained in the port, and there is a station, to afford assistance, on the mail steamer quay.

Supplies of fresh meat, vegetables, and bread can be obtained, and good water from a hose on the quay.

Trade.—The position of the city, and the shallowness of the lake, partly overcome by Le Canal, are disadvantageous to commerce, but the trade is, nevertheless, extensive, caravans arriving annually from the interior with senna, ostrich feathers, gold dust and ivory, which are exchanged for European manufactured goods.

The principal exports are phosphates, grain, mineral ores, oil, wine, hides, esparto grass, and cattle, and imports hardware, machinery, flour, wrought iron and steel, wheat and grain, cotton goods, sugar, coal, carriages, and timber.

Shipping. — In 1910, 1,337 steam vessels, with a total tonnage of 1,430,092 tons, and 909 sailing vessels, with a total tonnage of 32,597 tons, entered the Port de Tunis—La Goulette.

Tides.—Springs rise about 3 feet.

Tidal streams are appreciably felt in Le Canal, but their strength never exceeds one knot.

Climate.—The spring is warm, but hot weather sets in towards the middle of June and lasts till September; on the coast, however, the heat is tempered by a constant sea breeze, which blows from about 9 a.m. to near sunset. Notwithstanding this corrective the land winds are almost insupportably sultry, and bring with them clouds of fine sand which darken the air and penetrate into every recess. During a

General charts 250, 165, 2158a, 449.

Plan 1184, Bay and Lake of Tunis. Var. 9° W.

scorching scirocco, in July, the thermometer often stands at 93° in the afternoon and 84° at night.

During summer and early autumn rain is unusual, but it is expected about the middle of October, and should it not fall till later in the year, a scanty harvest is predicted. After the rains have commenced they continue with great violence for eight or ten days, thence to the spring a fine period for Europeans generally ensues, for the winter only includes the months of December and January, during which fresh winds and heavy rain render the air chilly and raw. A Meteorological table is given in Appendix III.

Coast.—From La Goulette the sandy beach, which is bordered by shallow water, continues to the south-westward for about a mile, and then trends to the south-eastward and eastward. About a quarter of a mile south-west of Le Canal there is a small opening into the lake, crossed by a pontoon bridge, and three-quarters of a mile further in the same direction are the Harem baths.

Two miles further south on a rise over the lake is the village of Radès, and near the coast, 4 miles south-eastward, that of Hammam Lif (*Lat. 36° 44′ N., Long. 10° 20′ E.*), with its warm baths (resorted to for medicinal purposes) situated at the foot of Jebel bu Kurnin, which is 1,887 feet high, and remarkable by two peaks.

Communication. — The railway from Tunis to Golfe de Hammamet runs about a quarter of a mile from the coast, and there is a station at Hammam Lif, also telegraphic communication there.

Chart 250, Fratelli rocks to Mahedia.

Coast. — About 7 miles southward of Hammam Lif, Jebel Résas, 2,608 feet high, is a large mass, with steep precipitous sides, and 23 miles south-westward from Jebel bu Kurnin is the summit of Jebel Zaghwan, 4,332 feet high, an excellent mark, and visible in clear weather from all directions seaward.

At about 3 miles eastward of the village of Hammam Lif the mountains recede from the coast in a south-easterly direction, and form the western boundary of the large and fertile plain of Soliman, which contains numerous villages and detached houses; the village of Soliman, with a large minaret, is conspicuous. The coast of the plain runs eastward for 8 or 9 miles, being generally a sandy beach fronted at a short distance by islets and rocks.

Five miles eastward of Hammam Lif the Wadi el Mela runs into the sea, and has the marabut of Sidi Jmil on its right bank: northward of the mouth of this stream are two shoals with $2\frac{1}{4}$ and $2\frac{1}{2}$ fathoms water over them, the latter about 6 cables from the shore, and a mile eastward there is a patch of $2\frac{3}{4}$ fathoms at the same distance from

Chart 250, Fratelli rocks to Mahedia. Var. 8° 50′ W.

the shore. There is a depth of $3\frac{3}{4}$ fathoms at $1\frac{3}{10}$ miles north-westward of the Wadi el Mela.

Marsa tal Fan, a lagoon about $2\frac{1}{2}$ miles further eastward, receives the water of the Wadi Sfa; from this to Sidi el Reis, $4\frac{1}{2}$ miles north-eastward, the shore is bordered by rocks.

Small white guard-houses for revenue purposes stand at intervals on the beach, near the end of which the plain terminates.

Gurbes rocks (Bancs de Sidi el Rais) (*Lat. 36° 46′ N., Long. 10° 32′ E.*) are two reefs awash, the western of which is $1\frac{1}{3}$ miles from the shore, with 8 fathoms water a cable from it, and 4 fathoms between it and the land. Vessels approaching this part of the Baie de Tunis should not stand in to less than 10 fathoms water.

Coast. — The coast which extends from Sidi el Reis to Ras el Fortas and formed at the foot of Jebel Gurbes (Guerbus), is rocky, steep, and indented. Near the centre of this part of the coast, in a deep ravine, is the little village of Gurbes (Guerbus), where there are hot springs and baths, which are even more frequented than those of Hammam Lif.

Ras Durdas is 3 miles north-eastward of Gurbes, and nearly midway between, a rock with 8 feet water over it lies nearly 2 cables from the shore, and is the only known outlying danger on this part of the coast.

Ras Zafran (Al Fortas) is a rocky point, 345 feet high, with some ruins on its summit, forming the eastern extreme of Baie de Tunis. Inland, south-eastward of the cape, the Abd-el-Rhaman mountains traverse the peninsula of Cap Bon for its entire length, and are connected with all the chains near the coast. The principal summits are Kef Abd-el-Rhaman, 1,991 feet; Jebel Hamid, 2,100 feet; Jebel Ben Ulid, 1,903 feet, and Jebel Bu Krib, a very remarkable cone in the middle of the peninsula, 676 feet high.

Coast. — Eastward of Ras Zafran the coast, still rocky and indented, is inaccessible for $3\frac{1}{2}$ miles, and then followed by a sandy beach about $4\frac{1}{2}$ miles in length, when the land becomes higher, rocky, and irregular. There are several small streams, and the coast is watched from guard-houses placed at intervals upon the coast. Off Ras Degbi Marsa, nearly 9 miles eastward of Ras Zafran, there is shoal water a short distance off-shore.

Between Ras Degbi Marsa and Anse de la Thonara (Thonnaire), $7\frac{1}{2}$ miles east-north-eastward, rocky points alternate with beaches, and the coast, although clear of danger, is not very accessible; three guard-houses and Sidi Daud marabut tower, one situated along the shore, and a marabut tower and guard-house on the south point of Anse de la Thonara, being white, are easily recognised.

General charts 165, 2158a, 449.

Chart 250, Fratelli rocks to Mahedia. Var. 8° 50′ W.

Tunny fisheries.—Tunny nets are laid out during the season, 1st April to 1st July, between Ras Zafran and Sidi Daud, the nets extending about 3 miles from the coast.

Tunny nets also extend in a northerly direction from Sidi Daud, and in a north-westerly direction from Ras el-Amar; also in a northerly direction from a point on the coast situated about 1¼ miles south-westward of Cap Bon. Tunny nets are also laid out off the south coast of Zembra island. For Lights, marks, and caution, *see* page 73.

A large tunny fishery establishment is in Anse de la Thonara, on an islet, connected with the shore by a viaduct on arches, and the establishment comprises a square white house, three storehouses, a large chimney, and a flagstaff.

Ras el-Amar (Burj Sidi Daud), 2 miles northward of Anse de la Thonara, is rugged and 110 feet above the sea, with a fort on it; the point a mile to the northward of it, is low, and has a bank of rocks awash, extending 1½ cables from it. Jebel Hamman, 1¾ miles south-eastward of the point, is 312 feet high, and surmounted by several ruins. This part of the coast should not be approached too closely, especially at night, as the land is low, and not easily made out.

Rock. — At one mile eastward of Ras el-Amar, and half a mile from the shore there is a rocky shoal 2½ cables long, north and south, and a cable broad, east and west; it has 2 feet least water over it, and is surrounded by depths of 5 fathoms.

Zembra (El Jamur) (*Lat. 37° 7′ N., Long. 10° 49′ E.*) (*see* view, page 446), 6 miles north-westward from Ras el-Amar, is in the form of a triangle with one side to the south, nearly 5 miles in circuit, high and precipitous, and has three summits, the highest being 1,421 feet high and steep-to on all sides, there being only one landing place in a small bay on its southern side, where there are some wooden huts, used as a lazaretto for pilgrims returning.

Lantorcho, a pinnacle rocky islet, lies nearly a third of a mile westward of its north end, and there are some other rocks near the shore round the island.

Zembretta, lying eastward, nearly 3 miles distant from Zembra, is a small horizontal plateau nearly a mile in circuit, 175 feet high, and like Zembra steep on all sides, with a small detached rock at its eastern and another at its western end. Vessels may pass on either side of it

Coast. — Between Ras el-Amar and Cap Bon the coast is rocky and indented, with a number of sharp points separated by small bays encumbered with rocks. The most sheltered of these bays is situated

Chart 250, Fratelli rocks to Mahedia. Var. 8° 40′ W.

about 4 miles eastward of Ras el-Amar, and here is El Awaria village, communication with which is easy from the bay; on all this coast there are numbers of ruins and vestiges of ancient quarries.

Plan of Cape Bon on 250.

CAP BON (ancient Hermæum prom.), which projects in a northerly direction about 7 miles eastward of Ras el-Amar, is a high, dark headland forming the eastern extreme of the Gulf of Tunis. About a mile within the cape the land rises to an elevation of 1,273 feet above the sea, and is surmounted by the ruins of an old tower, whence the land forms a declivity to the southward.

This lofty promontory, from its geographical position, is an important landmark to vessels navigating the channel between Sicily and the Tunisian coast, the great highway between the ports of western Europe and the eastern division of the Mediterranean.

In clear weather Cap Bon may be seen from a distance of 45 miles, and when first viewed from the eastward or westward, especially from the former, the comparatively low land to the southward is not discernible, causing the lofty headland to appear isolated. *See* views facing page.

A rock, with 6 feet water over it, lies a cable north of the cape.

LIGHT (*Lat. 37° 5′ N., Long. 11° 3′ E.*).—The lighthouse of Cap Bon, situated on the second hummock nearly three-quarters of a mile from the extremity of the cape, is a white circular stone tower, 81 feet in height, which exhibits, at an elevation of 412 feet above the sea, a *white group flashing* light, showing groups of *three* flashes *every twenty seconds*, thus:—flash, *one and one-fifth seconds;* eclipse, *two and four-fifths seconds;* flash, *one and one-fifth seconds;* eclipse, *two and four-fifths seconds;* flash, *one and one-fifth seconds;* eclipse, *ten and four-fifths seconds;* in clear weather it is visible from a distance of 27 miles. For arc of visibility, *see* Light list and chart.

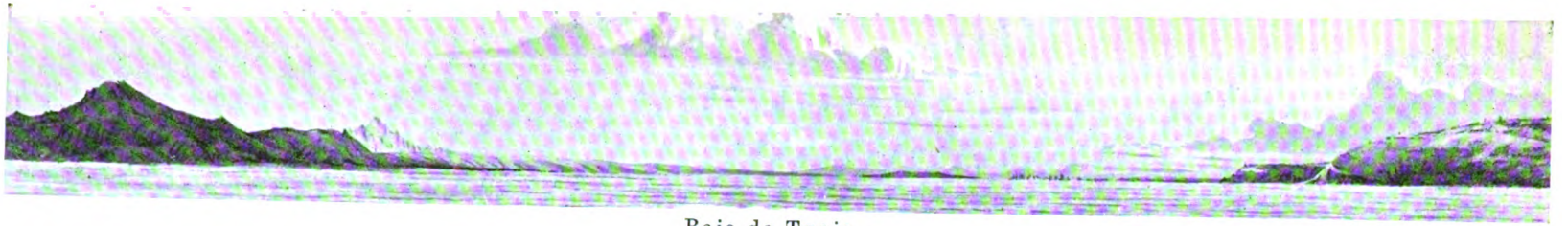
Lloyd's signal station.—Semaphore.—There is a Lloyd's signal station at Cap Bon, and a semaphore is situated on the ruins of an old tower, on the highest point (1,273 feet) south of Cap Bon; it is in telegraphic communication with Kelibia, and vessels can communicate by the International code, but it is often hidden by clouds. The call letters are A.K.W.D.

Anchorage.—Small vessels find temporary anchorage in the bay west of Cap Bon, but the bottom is rocky and the holding ground bad.

Chart 250, Fratelli rocks to Mahedia.

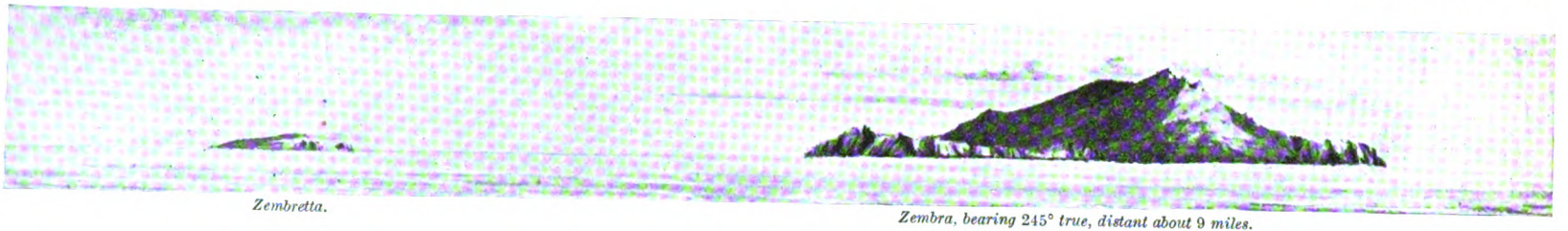
Depths off-shore.—Outside a distance of 2 cables the water is deep; the 100-fathoms contour line extends 8 and 12 miles in a north-

To face page 446.]



Baie de Tunis.

Cap Carthage, bearing 241° true.



Zembretta.

Zembra, bearing 245° true, distant about 9 miles.

Ras Idda, bearing 241° true.

Old Tower (Semaphore).

Cap Bon, bearing 263° true, distant 8½ miles.

Cap Bon, bearing about 180° true.

Chart 250, Fratelli rocks to Mahedia. Var. 8° 40′ W.

easterly and northerly direction from Cap Bon; there is, however, beyond this limit a shoal of 25 fathoms, rocky bottom, about 14 miles northward of the cape.

Coast.—From Cap Bon the coast trends in a south-easterly direction for nearly 3¼ miles to Ras Idda; it is almost everywhere bold and precipitous, being the base of the high ridge of the cape. On the shoulder of the ridge and near Ras Idda is a conspicuous fort 835 feet above the sea, named Burj el-Awaria; this hill has three conical summits.

Near Ras Idda (*Lat. 37° 3′ N., Long. 11° 5′ E.*) there are three points; the northern is dangerous, as rocks under water extend nearly 3½ cables in a north-easterly direction from it, having 20 feet water at their extreme.

Rocks also extend off Ras Idda, but they are entirely above water; the middle point appears to be clean. Cap Bon lighthouse, open east of the cliffs, bearing about 307° true, leads to the eastward of these rocks.

Anchorage may be obtained in the small bay on the south side of Ras Idda, in 6 or 7 fathoms water, protected from strong north-westerly winds, but the bottom is hard sand, strewn with rocks in places, and the holding ground not very good; heavy squalls come down from the mountains, and a swell sets in round this point.

CAUTION.—Attention is directed to the strong current said to exist in the vicinity of Cap Bon after prevailing winds from the northward and north-westward, the direction of the current being often South, and S.S.W. *See* page 54.

Coast. — The coast from Ras Idda, composed chiefly of sandhills with a low, rocky margin, runs nearly south for 10 miles to Ras el-Mihr, a low sandy point surrounded by rocks.

There are two or three guard-houses along the coast, and about 3 miles south-westward of Ras Idda is the large marabut of Sidi Mohamed Eshereef, surrounded by trees, behind which Gera Eshereef is 500 feet above the sea; 5 miles further south there is a red hill. The shore all along may be approached by the lead, the 10-fathoms contour line extending from half a mile to 1¼ miles off.

Tunny fishery. — Tunny nets are laid out, during the season, in an easterly direction from the point situated about 1¾ miles north-westward of Ras el-Mihr. For Lights, marks, and caution, *see* page 73.

Plan of Kelibia road on 250.

Ras el-Mihr.—Two lines of sandhills border the point, one to the north-westward, the other southward, and are edged by sandy

Plan of Kelibia road on 250. Var. 8° 40′ W.

beaches; the white sandhills show out well in contrast to the dark ridges behind them; they are the only sandhills on this part of the coast. The point is low, shoal water extends off it in a north-easterly direction, and it should not be approached within the distance of half a mile.

South of the point the beach is fringed for a short distance offshore with rocky heads.

Ras Mustapha.—At 2⅔ miles southward of Ras el-Mihr is Ras Mustapha, a rugged point which terminates in two sharp points on its southern side. On its summit is a fortified castle 270 feet above the sea, and the hill Burj Kelibia is so remarkable that it cannot be mistaken for any other summit on the coast of Tunis; westward of it are the ruins of the ancient Clypea, with the remains of two moles. On the cape is a small battery in ruins, and above the battery the tomb of Sidi Mustapha, from which the cape takes its name. *See* view on chart.

LIGHT (*Lat. 36° 50′ N., Long. 11° 7′ E.*).—A *fixed white* light, elevated 269 feet above the sea, and visible, in clear weather, from a distance of 14 miles is shown from a platform of masonry about 6 feet above the parapet of the bastion of the fortress, the whole 59 feet in height.

Mersa Kelibia. — From Ras Mustapha the coast curves to the north-west, round west, to south-west, forming a bay with a long irregular sandy beach, on which are masses of weed resembling rocks. At 2 cables from the beach there are rocky ledges parallel to the shore, with from 6 to 10 feet water on them.

Anchorage. — The bay affords safe and convenient anchorage with northerly and north-westerly winds, and may be used with advantage by vessels unable to get to the westward, in preference to remaining at sea and contending with boisterous weather and strong currents in the Malta channels, but the holding ground is only moderate.

The best anchorage is in 6 fathoms water, over sand and weed, with the Parlatorio, near which is a battery, bearing 328° true, and the extreme of Ras Mustapha, bearing 57° true; but with winds from the north-eastward there is better protection on the same bearing of Ras Mustapha, but with Sidi Said marabut bearing 290° true. As the road is exposed to the south-eastward vessels should leave at once if the wind comes from that quarter.

Town.—The town of Kelibia, 1½ miles to the north-westward of Ras Mustapha, is regularly built, and remarkably clean; it has three mosques, the minaret of the principal being a conspicuous object from

General charts 250, 165, 2158a, b, 449.

Plan of Kelibia road on 250. Var. 8° 40′ W.

seaward. Cereals and fruit trees are cultivated, and there are gardens and olive groves. The population is about 6,500, composed of Italians and Arabs, augmented, during the summer, by a number of people from Tunis. The Custom house is on Ras Mustapha.

Communications.—A railway from Tunis to Kelibia is under construction. Telegraphic communication at Kelibia and also at Menzel Temini, a village near the coast, 6½ miles south-westward.

Supplies. — Water may be obtained with some slight difficulty, cattle, fresh meat, fowls, and eggs in any quantity, but vegetables and fruit are scarce. Several vessels call here during the summer season for cattle and grain, generally for Malta and Sicily.

Chart 250, Fratelli rocks to Mahedia.

Tunny fishery.—Tunny nets are laid out during the season, 1st April to 1st July, in a north-easterly direction for a distance of about 1$\frac{1}{10}$ miles from the coast, abreast Sidi Sellim marabut, 6 miles south-westward of Kelibia. For Lights, marks, and caution, *see* page 73.

Coast. — From the Parlatorio of Kelibia to Ras Mahmur, a distance of 27 miles, is an unbroken line of beach, slightly curved, without off-lying dangers, which may be safely approached within a mile, at which distance from the shore there will generally be found a depth of 10 fathoms over a sandy bottom.

The marabuts of Sidi Yaya, Sidi Assen, Sidi Sellim, and Sidi Othman Hadits are near this coast; the villages of Menzel Temini (the principal one, having a population of 1,500 to 2,000), Menzel Heur, Kurba, on slopes covered with plantations, the picturesque village of Soma on the slope of Jebel Soma; the villages of Tazarka and Marmora, on hillocks near the coast, and some guard-houses, are all conspicuous objects along this line of coast. Behind a low ridge of sand are numerous lagoons which are nearly dry in summer.

About 11 miles inland are the remarkable summits of Jebel Bukrib, Jebel Ben Ulid, Jebel Kef, and Jebel Sidi Abd el Rahman, the latter elevated 2,100 feet above the sea (described on page 444), thence gradually declining and approaching the coast towards Ras Mahmur. The land between is a fertile undulating plain richly cultivated with olives, and interspersed with several villages.

Ras Mahmur (*Lat. 36° 27′ N., Long. 10° 49′ E.*) is a low cape with houses and trees, having a village of the same name half a mile from the shore; a hill slopes down to it in a south-easterly direction, on the shoulders of which stands a tomb, named Sidi Jabrur, which is very conspicuous along the coast.

General charts 165, 2158a, 449.

Chart 250, Fratelli rocks to Mahedia. Var. 8° 40′ W.

Shoal water extends some distance south-east of the cape, a depth of 3½ fathoms being found three-quarters of a mile from the shore.

Landing can be effected at the extreme of a wharf, and there is a good carriage road to Nebœl.

Anchorage.—There is good anchorage to the southward of the cape, in 7 fathoms water, half a mile from the shore, with the cape bearing 61° true. Care must be taken to keep the lead going, as the water shoals quickly within the 10-fathoms contour line.

Bancs de Kurba, Mahmur, and Nebœl are three banks lying off Ras Mahmur, not dangerous, but useful in thick weather to vessels navigating this part of the coast; the centre and shoalest part of the first mentioned, with a depth of 15 fathoms, lies eastward about 11½ miles from Burj el Kurba; it is about 7 miles long in a north-easterly and south-westerly direction, and 3 miles broad, the bottom being of sand, shells, and gravel, with 25 fathoms all round.

Banc Mahmur, 11 miles southward of Ras Mahmur, has 13 fathoms on the shoalest part, the bottom being sand and coral; it is about 5 miles long and 2 miles broad, with 23 fathoms close round its edge.

Banc Nebœl is a triangular shoal, its shoalest part of 15 fathoms (coarse sand) lying 4½ miles southward from Ras Mahmur, to which it is connected by a spit having from 18 to 20 fathoms over it, and deeper water on both sides.

Nebœl (*Lat. 36° 27′ N., Long. 10° 45′ E.*), nearly 4 miles westward of Ras Mahmur and about one mile from the coast, is an important industrial centre, with about 5,000 inhabitants; there are potteries and weaving shops; it is usually the residence of the governor of the district, and near it is the site of ancient Neapolis.

Communication. — Railway communication with Tunis, Hammamet and Susa, telegraphic communication, and a good carriage road to the coast near Sidi Mahmur.

GOLFE DE HAMMAMET.—This indentation lies between Ras Mahmur on the north, and Kuriat islands on the south, the latter being distant 41 miles from the former, the gulf within it being about 22 miles deep. The depths over this space are irregular, indicated by Banc Mahmur before mentioned; there are from 40 to 50 fathoms westward of the uneven ground, and 20 fathoms within 2½ and 3½ miles of the shore, and along the northern half of the bay 5 fathoms will be found within half a mile of the beach, but towards the south it is shallower.

General charts 165, 2158a, 449.

Chart 250, Fratelli rocks to Mahedia. Var. 8° 40′ W.

The shores of the gulf are chiefly low and sandy, with much uncultivated land on the north-west side, and a small population; the ground rises to about 1,000 feet at 6 miles westward, and about 17 miles from the shore Jebel Zaghwan is 4,232 feet above the sea. Near the shore, about the centre of the bay, is Sebkha Jiriba, a narrow and shallow lake about 17 miles in length, and southward of it are the more cultivated and flourishing districts of Susa and Monastir.

Coast.—The coast between Ras Mahmur and Hammamet, 10 miles apart, is low and backed by a long ridge of hills sloping to the south-eastward. Jebel Bu Rukba, the highest summit, 1,706 feet above the sea, is situated 4 miles northward of Hammamet; there are several villages on the fertile slopes, a guard-house on the coast below, and some ruins and tombs along the beach.

Plan of Bay of Hammamet on 250.

Hammamet. — The fortress of Hammamet is built on a small sandy promontory, which forms the eastern boundary of the bay of the same name, the elevated land at the back being very fertile, and covered with detached houses, gardens, and olive groves (*see* view on chart). There is a trade in corn, wool, and oil, and the population is about 5,000. Westward of Jebel Bu Rukba is a valley leading to the extensive plain of Soliman already alluded to; through this runs the main road to Tunis from Hammamet and the southern ports of the regency.

Light (*Lat. 36° 23′ N., Long. 10° 37′ E.*).—On the western angle of the fortress at an elevation of 49 feet above the sea, is exhibited a *fixed red* light, which is visible in clear weather from a distance of 4 miles. The light is obscured by Hammamet mosque between the bearings of 252° and 255° true.

Anchorage.—Large vessels anchor in depths of 7 or 8 fathoms, about three-quarters of a mile from the shore, with the guard-house, about 2 miles eastward, in line with Ras Hammamet, bearing about 66° true; the holding ground is only fairly good, and the anchorage is open to south and south-easterly winds. The bay westward of the fortress is a good and safe port for coasters, there being anchorage in 18 feet water, at a quarter of a mile from the shore, with the southern bastion bearing 65° true.

Bir el Bueta, a large ruin and halting place for travellers, is conspicuous from the sea, standing on the western shore of the Baie de Hammamet, about 3½ miles west of the fortress.

Nearly three-quarters of a mile south-eastward of Bir el Bueta is a small patch of 5½ fathoms, with depths of from 7 to 8 fathoms around it.

Communication. — Hammamet has railway communication with Nebœl, Tunis, and Susa, also telegraphic communication. Good carriage roads to Tunis and Susa.

General charts 165, 2158a, 449.

Chart 250, Fratelli rocks to Mahedia. Var. 8° 40′ W.

Supplies. — Some supplies may be obtained, and abundance of water at a water-post situated at the western angle of the fortifications about 10 yards from the beach.

Coast. — Between Hammamet and Herkla, a distance of 22 miles, the coast is a curved sandy beach, clear of danger throughout its whole extent; there are some mountains about 6 miles from the coast, but their summits are not easily distinguished; Takrun, 624 feet high, is a truncated cone with a village on its summit, and may generally be recognised, and near the coast there are several guard-houses and marabuts.

Herkla (*Lat. 36° 2′ N., Long. 10° 30′ E.*), upon the site of several earlier stations, including that of Horrea Cælia of the lower empire, stands on a cliffy point, having a mosque elevated 109 feet above the sea; it is the only break in the long line of beach from Hammamet, and the coast south from the point is broken by rocky projections between small sandy bays; some few detached rocks lie off it, and a depth of 5 fathoms will be found at half a mile beyond.

The land behind Herkla is low and swampy, occupied by a broader continuation of Sebkha Jiriba, named Sebkha el Menzel, which communicates with the sea, 3 miles to the southward; in winter Herkla is an island, with communication both north and south.

There are ruins about the town, and olive trees behind, and in clear weather it can be seen from a distance of 18 miles, and at times has been mistaken for Susa; on a nearer approach, however, the mistake is discovered by the red colour of the houses, those of Susa being very white.

Coast.—The land south of Ras Herkla is easily recognised by the remarkable table elevations named Les Sorelles, which to the northward show as three peaks at equal distances from each other resembling three isolated forts; they are about 1½ miles westward of Ras Marsa and 383 feet above the sea. On a small spur of Les Sorelles is Sidi el Kantawi marabut, and between Ras Herkla and Ras Marsa the coast is bordered by rocks as far as the outlet of Sebkha el Menzel.

Chart 1159, Susa to Mahedia, &c.

Ras Marsa, lying 9 miles south-eastward of Ras Herkla, projects slightly from the coast. The sandhills on it are higher than those of the rest of the coast, and one near the point has a guard-house on it. A rocky flat, with about 12 feet over it, extends half a mile from the shore and is dangerous.

Tunny fishery. — Tunny nets are laid out during the season, 1st April to 1st July, in a north-easterly direction, for a little more than one mile from Ras Marsa; a passage for small craft, about 4 cables wide, is left open between the shore end of the nets and the coast. For Lights, marks, and caution, *see* page 73.

General charts 165, 2158a, 449.

Chart 1159, Susa to Mahedia, &c. Var. 8° 40′ W.

Bay of Susa. — Between Ras Marsa and the promontory of Monastir, 12 miles south-eastward, is the Bay of Susa, 3½ miles deep, with a low sandy coast line. The land here is fertile, covered with olive groves, and interspersed with villages, farms, and numerous country houses and gardens.

Two miles southward of Ras Marsa there is a point, with a shoal off it, on which there is 2 fathoms water, at a third of a mile distant from the point; here there is a conspicuous large, square, white house named Villa Grandolphe, and westward of it, in the valley, the village of Hammam Susa.

Submarine vessels.—For regulations and signals, *see* page 20.

Fairway reserved for traffic. — When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port of Susa are **earnestly requested** to make use of the fairway defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:—

On the north, by the alignment, 210° true, the chimney of a factory, situated southward of the town, and the head of Grande Jetée.

On the south, by the coast south of the town.

Vessels inconvenienced by searchlights.—For signals to be made *see* page 65.

SUSA. — The Port of Susa (French Sousse) consists of a breakwater, Grande Jetée, which, commencing north-eastward of the town, has a south-easterly direction for 230 yards, and then a slightly more easterly direction for 550 yards, and, from its change of direction, an arm forming l'Epis Nord extends southward for a distance of 200 yards.

From the southern part of the town, at nearly half a mile from the commencement of Grande Jetée, a mole extends in an easterly direction for 317 yards, and turning northward, has a further length of 405 yards, forming l'Epis Sud, leaving between an entrance 76 yards wide, and dredged to a depth of 24 feet.

In the area enclosed there is a space of 31 acres, with a uniform depth of 21 feet.

Depths. — In the port there is a depth of 3½ fathoms, in the entrance 4 fathoms, and in the outer roads 6 to 7 fathoms.

LIGHTS (*Lat. 35° 49′ N., Long. 10° 38′ E.*). — A white square stone tower, 72 feet in height, and standing in the Kasba, exhibits,

Chart 1159, Susa to Mahedia, &c. Var. 8° 40′ W.

at an elevation of 230 feet above the sea, a *flashing white* light, *every five seconds*, showing a *flash* about *one second* duration followed by a total eclipse of about *four seconds*, and visible in clear weather from a distance of 21 miles.

A *fixed white* light is shown from the end of Grande Jetée, at an elevation of 29 feet above the sea, from an iron support on a building 27 feet in height. It is visible in clear weather from a distance of 6 miles.

A *fixed* light, showing *green* seaward and *white* in other directions, is exhibited from l'Epis Nord; and a similar light, showing *red* seaward, from l'Epis Sud. Both lights are elevated 15 feet above the sea.

Roadstead.—The shallows, which are bounded by the 5-fathoms contour line, extend off the shore, about a mile eastward of the town, and outside it there are some patches of 4½ and 4¾ fathoms, with 6 and 8 fathoms round them. At 2 miles out the soundings increase to 10 fathoms, over sand, mud, and some weed.

Buoy. — A black conical buoy lies 1¼ cables southward of the end of Grande Jetée.

Anchorage. — The anchorage is open from N.W. round eastward, to S.E., but is safe except during the winter season.

Large vessels will find good anchorage in from 6 to 7 fathoms water at three-quarters of a mile from the extreme of the breakwater, with Sidi Zaffar, a marabut tower, north of the town, bearing 295° true, the tower of the Kasba 267° true, and Sidi Najar, the large marabut, on a green hill 5 miles south of the town, 166° true.

Smaller vessels may anchor closer in with Sidi Najar, and Sidi Abd-el-Hamid marabuts in line bearing about 160° true, but not northward of the Kasba tower bearing 267° true.

Occasionally the wind blows very heavily from the east and north-east; the sea, however, is very much reduced within the 10-fathoms and 8-fathoms contour lines.

Caution is requisite in taking up a berth in Susa roadstead. The bottom has been rendered uneven by vessels discharging their stone ballast; in some parts the water has shoaled 6 or 7 feet.

Town (*Lat. 35° 49′ N., Long. 10° 38′ E.*). — The town of Susa (ancient Andrumete) rises gradually from the coast to the Kasba at the south-west, within which is a conspicuous tower elevated 260 feet above the sea, two minarets, and on the coast further south the chimneys of manufactories are conspicuous. The walls surrounding the town are from 30 to 40 feet in height, having bastions and towers at the several angles. Upon either side of the town are well wooded ridges dotted

Chart 1159, Susa to Mahedia, &c. Var. 8° 30′ W.

with houses, which, together with the citadel and tower, are easily distinguished on approaching the anchorage. The town has also a particularly white appearance.

Susa is healthy, wonderfully clean, and has paved streets, also contains several handsome mosques and well-kept bazaars, and has about 40 olive mills besides manufactories of linen, with an active trade in oil, wood, pottery, shoes, &c., and the surrounding plain is full of large and prosperous villages; in good years a large quantity of grain is grown in the district. The population is estimated at about 25,000. A British Vice-Consul resides here.

Communication. — Steamers leave Susa twice every week for Tunis, and once weekly for Bizerta and Marseille. Susa is connected by rail with Tunis, Kairuan, and Mahedia. A railway to Sfax is under construction. There is telegraphic communication with Tunis and Sfax.

Coal and supplies. — Coal is imported by a private firm, but for its own use only.

Fresh provisions can be obtained in abundance, and fair water from a hose on the quay.

Life-saving station. — A life-saving station, furnished with a rocket apparatus, is maintained at Susa.

Shipping. — During the year 1910 the port was entered by 359 steam and 548 sailing vessels, with aggregate tonnages respectively of 349,102 and 15,002 tons.

Coast. — From Susa a continuous sandy beach, with masses of seaweed, trends to the south-eastward, behind which is a large, slightly undulating plain covered with vegetation; inshore there are two lakes and a large lagoon, Sebkha Aïn Sahalin (*Lat. 35°45′N., Long. 10°47′E.*), which lies about 7 miles south-eastward of Susa. It is a shallow sheet of water, which partially dries in summer, and has an entrance from the sea through a small channel encumbered with seaweed. The bridge over it is said to date from the Roman times.

Depths off-shore. — Shoal water extends for some distance off this coast. At three-quarters of a mile there are depths of from 13 to 16 feet, and depths of 5½ fathoms 1½ miles from the shore; large vessels should not approach within a distance of 1½ miles. Eastward of the outlet of Sebkha Aïn Sahalin the shore is fronted by shoal water, with depths of from 3 to 18 feet, and there are depths of 12 feet two-thirds of a mile from the coast.

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Plan of anchorage of Monastir on 1159. Var. 8° 30′ W.

MONASTIR.—Presqu'île de Monastir, about 9 miles eastward of Susa, is 2½ miles across; its northern face, formed by a low line of yellowish rocky cliffs, is 121 feet high, behind which is a large white villa standing amongst trees, and more to the eastward a large koba; the greater part of the promontory is covered with gardens and olive groves.

Lights (*Lat. 35° 46′ N., Long. 10° 50′ E.*). — A *fixed red* light is shown, at an elevation of 29 feet above the sea, from the minaret of Burj el Kelb, 20 feet in height, and is visible in clear weather from a distance of 5 miles. For arc of visibility, *see* Light list.

A *fixed green* light is shown from an iron pillar, 13 feet in height, on the Custom-house landing pier southward of Burj el Kelb; it is elevated 19 feet above the sea, and, in clear weather, is visible from a distance of 2 miles.

Pier.—The Custom-house landing pier has a light at its extreme, as mentioned above, and has a depth of 7 feet at its extremity.

There are also three wooden jetties; the longest one is 70 yards long, and has a depth of 4 feet at its extremity.

Jezirat Egdemsi, on which there is a large marabut tower, lies about 2 cables off the north-east point of the promontory; there are several ruins on it, and, on the east side, square-shaped grottos. Ksira te Achmam, a small islet, lies off its north extreme, and between Egdemsi and the mainland is a small boat harbour named Anse du Cimetiere from the large Arab cemetery near the shore; Ksira Lostania, about 1½ cables southward of Jezirat Egdemsi, has also several caves frequented by the fishermen.

Anchorage.—The only good anchorage is off the Custom-house, bearing 282° true, and, with a large house in line with the north point of Jezirat Egdemsi, from 7½ to 8 fathoms will be obtained, and closer in with the same house in line with the point of the cliff north-eastward of Burj el Kelb, 5 to 5½ fathoms: the holding ground is only fairly good.

The anchorage is not frequented, the position being so much exposed, but vessels of war occasionally anchor there, if remaining but a short time. Monastir will readily be distinguished by the many palm trees scattered over the promontory, which are rarely seen over other parts of the coast.

Town.—Monastir (Hadrumetum of the ancients) is an irregularly built, clean and picturesque town, about half a mile in extent, and enclosed by walls, with a citadel upon the north-east corner, from which rises a conspicuous tower 73 feet high: it is fronted by low cliffs and a sandy beach with a shallow approach: it lies about a mile

General charts 250, 165, 2158a, 449.

Plan of anchorage of Monastir on 1159. Var. 8° 30′ W.

northward of the Custom-house pier. The trade of Monastir is inconsiderable, consisting chiefly of olive oil, and the population is about 8,000.

Communication. — There is communication twice a week by steamer with Susa and Tunis, calling at the intermediate Tunisian ports, and weekly with Tripoli. Monastir is connected with the main telegraph system.

Supplies. — Some supplies may be obtained, and water is good and plentiful.

Landing can always be effected at the Custom-house pier, which has about 7 feet water at its extremity.

Shipping. — During the year 1910 the port was entered by 214 steam, and 482 sailing, vessels, with aggregate tonnages respectively of 214,555 and 6,119 tons.

Tides. — It is high water, full and change, at Monastir, at Ih. 47m.; the rise is about one foot.

Chart 1159, Susa to Mahedia, &c.

The Gulf of Monastir is formed between Presqu'île de Monastir and Kuriat islands; the shallows, connected with the latter and the shore, extend considerably beyond the head of the bay, but leave an available space for anchorage of 5 miles east and west, by 3 miles deep. A depth of 5 fathoms will be found at about 3 miles from the shore, in the western part of the gulf. The worst winds are those from the north and north-east, but they rarely blow with any great force. Approaching the land about the gulf, Kuriat islands will be seen in clear weather from a distance of 7 or 8 miles.

Kuriat islands. — From the coast, between Monastir and Ras Dimas for a distance of 12 miles, a triangular bank, within the 10-fathoms line, extends, for a similar distance, with the apex of the triangle to the north-east, and inside this a strip of earth and rocks covered with weeds, named Dahar, is awash for the distance of 4 miles from the shore; the continuation of this strip for 6 miles, in a north-easterly direction, has on it two islets named Kuriat.

The outer and larger of these is about a mile in extent, with a hummock elevated 23 feet above the sea; there are several ruins on this islet, a well of good water near the ruins, and two small lagoons which are dry in summer.

LIGHT (*Lat. 35° 48′ N., Long. 11° 2′ E.*).—On the north-eastern part of the northern of the Kuriat islands, a white square stone tower, 85 feet in height, and having a dwelling near, exhibits, at an elevation of 96 feet above the sea, a *fixed* light, with *red*

Chart 1159, Susa to Mahedia, &c. Var. 8° 30′ W.

and *white* sectors; the white light is visible in clear weather from a distance of 16 miles and the red 14 miles. For sectors, *see* Light list and chart.

Beacon. — A beacon, surmounted by a **V**-shaped topmark, is situated west of the island to mark the extremity of the depth of 3 feet off it, and also shows the best landing place.

Conigliera, the smaller island, 20 feet above the sea, is 1½ miles south-westward of Kuriat island, and separated by a channel with 6 feet water in the centre and 12 feet on either side of it; it has some vegetation, and on it are the buildings of the tunny fishery.

Boat channel.—Buoys (*Lat. 35° 46′ N., Long. 11° 1′ E.*).— There is a passage for boats between Conigliera and the mainland, which is marked by four buoys; those on the northern side of the channel are black can buoys, with conical topmarks, and those marking the south side of the channel are red conical buoys, with cylindrical topmarks.

To find the channel, coming from the westward, keep Pointe de Monastir bearing 285° true until the buoys are sighted, and coming from the eastward keep Monastir town a little open to the right of the black buoys until near the channel.

A depth of 10 feet at least will be found in the channel.

Tunny fishery. — Tunny nets are laid during the season, between 1st April and 1st July, north-westward of Conigliera. The position varies from year to year, but they sometimes extend for a distance of over 3 miles from the island. Fishermen are forbidden to fish near these nets. For Lights, marks, and caution, *see* page 73.

Anchorage may be obtained upon either side of the islands in 6 or 7 fathoms, over good holding ground. The best anchorage, when the wind allows, is on the eastern side of Kuriat, with the lighthouse bearing 348° true, and as close to the shore as the vessel's draught will admit. There are no hidden dangers beyond the shoals of 2 miles in breadth on which these islands are situated, but great attention should be paid to the lead, and sailing vessels working along this coast should not stand in to less than 10 fathoms water.

Coast.—The coast of the bay, south of Burj el Kelb, is low and marshy, and an isthmus separates Sebkha Aïn Sahalin from the sea; off the isthmus El Gregeh, a low island covered with vegetation, is surrounded by shallow water. On the coast is the koba of Sidi Zaghuani, and a little south-westward the village of Neis, surrounded by trees, but the minaret visible.

From this, towards Ras Dimas, a line of sandhills, of moderate height and covered with vegetation, borders the coast; Sidi Messaud

General charts 250, 165, 2158a, b, 449.

Chart 1159, Susa to Mahedia, &c. Var. 8° 30′ W.

marabut; Xiebah village with a short minaret; Lampta village, with two marabuts; and Saïada village, which shows up white amongst the green olives, are all marks on this part of the coast, and further eastward is a large white house surmounting Enshir el Bey, and Sidi Fatlin marabut, which may also be recognised by a remarkable isolated palm.

Tebulba village (*Lat. 35° 38′ N., Long. 10° 59′ E.*) is about three-quarters of a mile inland, and the same distance westward of Sidi Fatlin marabut, and about 3 miles north-westward of the village there is a space about 2½ miles in length, with an average breadth of half a mile, in which the depths are from 3¼ to 4 fathoms; it is accessible by a narrow passage on its northern side to vessels drawing about 15 feet water. This space was the harbour of the ancient Leptis Parva, the ruins of which town lie on the coast about a mile south-westward of its western extreme.

Buoys.—A large black spindle buoy, surmounted by a square, is moored, in 19 feet water, on the east side of the entrance. This buoy should be seen from a distance of 4 miles.

A small black conical buoy, with similar topmark, in 22 feet water, on the edge of the bank on the east side of the channel and south of the preceding.

A small red conical buoy, surmounted by a conical topmark, in 15 feet water, on the west side of the channel and westward of the preceding.

A small red conical buoy, surmounted by a conical topmark, in 16 feet water, on the elbow of the shoal water on the north side of the anchorage.

Directions. — Tebulba minaret, bearing 155°, leads to the entrance, but, when approaching, the inner black buoy should be opened slightly to the westward of the outer; the deeper water is towards the east side, and shoalest water (16 feet) between the inner black buoy and the red buoy opposite it.

Communication. — The railway between Susa and Mahedia runs through Tebulba.

Ras Dimas is situated on the site of the ancient city of Thapsus, of which are extensive ruins, with the remains of an old mole: within, on slightly elevated ground, is Burj Mkalta, but the point is still not easily distinguished; shoal water extends northward of the cape, the 5-fathoms contour line being 2 miles distant from it in that direction, and to the eastward there are shoals off the old mole, and the 5-fathoms line is here 1⅓ miles from the coast.

General charts 250, 165, 2158a, b, 449.

Chart 1159, Susa to Mahedia, &c. Var. 8° 30′ W.

Anchorage, fairly well sheltered from northerly winds, will be found under Ras Dimas, with the point bearing 330° true and a conspicuous signal on a hill, 165 feet high, about a mile southward of Ras Dimas, bearing 260° true.

Coast. — From Ras Dimas the coast, consisting of a long sandy beach, runs with a westerly curve directly south for 7 miles, and is free from danger beyond the 5-fathoms line, distant three-quarters of a mile. A long, narrow lagoon lies a little within the coast at the foot of a ridge of hills from 100 to 150 feet above the sea, and the land is thickly cultivated with olive groves. *See* view on chart.

Plan of anchorages of Mahedia on 1159.

MAHEDIA.—The above-mentioned beach is terminated by Ras Mahedia or Cape Africa, a narrow rocky peninsula, extending about a mile in an easterly direction, on which stands the town encircled by dilapidated walls, and a castle or fortress upon an elevation of 96 feet. Besides other ruins there are, on the south side of the point, those of an ancient port, an artificial excavation of between 2 and 3 acres.

Mahedia is supposed to occupy the site of Turris Hannibalis, whence Hannibal took his departure for Asia; it may be distinguished by its large white Kasba, and a small hillock surmounted by Sidi Jabber marabut. Within the peninsula are many scattered houses with gardens and olive trees, and a little to the southward is a salt lake. The surrounding land is rich and well cultivated. The population is about 12,000, and a British Consular agent is resident.

Breakwater. — A small breakwater extends from the western part of the town; it is about 1½ cables in length, and commencing in a southerly direction turns south-west and west.

LIGHTS (*Lat. 35° 30′ N., Long. 11° 5′ E.*). — A white square tower, 41 feet in height, having a dwelling near, and situated on the hillock of Sidi Jabber, exhibits, at an elevation of 90 feet above the sea, a *flashing red* light, *every five seconds*, which shows a *flash* of about *one second* duration, followed by an eclipse of about *four seconds*. It is visible in clear weather from a distance of 16 miles.

From the breakwater, a *fixed red* light is shown, at an elevation of 15 feet above the sea, from a wooden support 5 feet in height; it is visible in clear weather from a distance of 3 miles.

Beacon.—There is a beacon on the breakwater head.

Tunny fishery. — Tunny nets extend, during the season, 1st April to 1st July, in a north-easterly direction from a point situated 1½ miles north-westward of Ras Mahedia. For Lights, marks, and caution, *see* page 73.

General charts 250, 165, 2158a, b, 449.

Plan of anchorages of Mahedia on 1159. Var. 8° 30′ W.

Anchorage.—Abreast of the castle and ancient port the water is deep close in, but off the southern bight shoal water extends nearly a mile out, on which are patches of 9 and 12 feet. There are anchorages on both sides of the cape; on the north side with southerly winds, in 7 fathoms water, over sand, with Ras Mahedia bearing about 123° true, and the square tower on the western gate 182° true; smaller vessels may lie closer in, according to draught.

The southern anchorage (*Lat. 35° 30′ N., Long. 11° 5′ E.*) is the one principally used, although the holding ground is not good. It is completely sheltered from North and N.E. winds; vessels anchor in a depth of 7 fathoms, with the lighthouse bearing about 11° true, distant half a mile, and smaller vessels lie closer in. Caution is necessary, so as to clear the shoal before mentioned.

On account of the bad holding ground large vessels should not anchor too close to the land, nor westward of a line between the lighthouse and a ruined portico near the entrance of the ancient port; this latter mark must not be confused, as there are many ruins near the old port.

Buoys. — A bank, with from 7 to 12 feet water over it, extends 3½ cables eastward of Ras Mahedia, and a red spindle buoy, surmounted by a red ball, is moored in 8 fathoms about half a mile south-eastward of the cape, off the south-eastern edge of the bank. A red buoy for the use of the mail steamers lies about 4 cables south-eastward of the breakwater. Four small buoys, two red conical, and two black conical, are moored off the European and Jewish cemeteries 1¼ miles south-westward of Ras Mahedia to mark a bank with only one fathom over it. The northern buoys are red and the southern black.

Communication. — Steamers run twice a week to Monastir, Susa, and Tunis, calling at intermediate ports, also weekly to Tripoli. The railway from Susa and Kairuan runs to Mahedia.

Mahedia is connected with the main telegraph system.

Supplies of fresh provisions may be obtained.

Trade.—The trade is chiefly in olive oil, and during the summer months a considerable quantity of fruit is exported.

Shipping. — In 1910, 222 steam vessels, of a total tonnage of 217,705 tons, entered the port, and 629 sailing vessels, of a total tonnage of 9,559 tons.

Tides. — It is high water, full and change, at Mahedia, at 1h. 32m.; the rise of tide is about one foot.

General charts 249, 250, 165, 2158a, b, 449.

Chart 1159, Susa to Mahedia, &c. Var. 8° 20′ W.

Coast. — The coast south of Mahedia, for a distance of 7 miles, is low beach of sand and rock; within, on the low undulating country, are gardens, plantations of olives, and a number of houses, many in ruins. Rejish village, 3 miles southward of Mahedia, shows up white, and on the higher western ridge is the town of Ksur Sef, with about 5,000 inhabitants. This coast, from 2 miles southward of Mahedia, is free from danger to within half a mile of the shore, at which distance there are 5 fathoms; closer in, the bottom is uneven and rocky, affording no good anchorage. *See* view on chart.

Chart 249, Mahedia to Ras Makhabez.

Ras Salakta, a small rocky projection on which are some ruins and a few houses, lies 7 miles to the southward of Ras Mahedia; a ridge of low hills rises from the point towards the west, having an elevation of 184 feet.

Anchorage.—Landing.—A flat of small rocks surrounds the point, and two islets south-eastward of it form a small bay sheltered from the north, affording anchorage for small vessels; landing may be easily effected.

Supplies.—A carriage road connects Ras Salakta and Ksur Ser, a town about 2½ miles inland, with an agricultural population of about 5,000 inhabitants, and some supplies may be obtained there. There are reservoirs of water on the beach of the small bay.

Coast.—Southward of Ras Salakta the coast is composed of small hills of sandstone covered with sand and rocks, alternating with some sandy beaches, and 9½ miles south, Sidi Abdalla marabut, is large and conspicuous, and on a low point, 1½ miles south-eastward, a remarkable square tower, 92 feet in height, named Khadija, which may be seen from a distance of 15 miles.

Ras Kapudia (*Lat. 35° 13′ N., Long. 11° 9′ E.*) is the extremity of a low peninsula, which, with a rocky flat, extends southward from Burj Khadija; some rocks under water lie northward of the flat and three very low islets extend southward of the point.

Supplies. — The village of Sheba, with houses surrounded by gardens, is situated 2½ miles eastward, and fresh provisions and water may be obtained; it is inhabited by Arab fishermen and Maltese engaged in the sponge fishery.

Tides. — It is high water, full and change, at Ras Kapudia, at 1h. 7m.; the rise is about 1¼ feet.

Tunny fishery. — Tunny nets extend, during the season, 1st April to 1st July, about one mile eastward of Burj Khadija. For Lights, marks, and caution, *see* page 73.

General charts 2158a, b, 449.

Chart 249, Mahedia to Ras Makhabez. Var. 8° 20′ W.

BANCS KERKENAH, commencing at, and extending 35 miles south-eastward from, Ras Kapudia, have then a south-westerly direction for about 42 miles to 14 miles southward of Sfax. They cover a vast extent, are shoal, and in many parts dry; in others have narrow guts in which the water is somewhat deeper. The chart is a better guide than any description of these shoals.

Kerkenah channel, navigable for small vessels, drawing 9 feet water, and formed between the islands and the mainland, is buoyed as mentioned later on.

The elevated parts of Bancs Kerkenah, when there is less than 3 feet water, and wherever the bottom is not hard, is covered by fishing nets; the posts, to which the nets are secured, being visible for about 3 miles.

Kerkenah islands, situated towards the south-western extreme of the banks, consist of Jezirat el Kerkenah (ancient Cercina); Gharbi (ancient Cercinitis) and five smaller islands, of which Rumedia and Gremdi are the principal; they are low, covered in places with palm trees which may be seen from some distance, and have a population of from 5,000 to 6,000, mostly engaged in fishing, but corn, barley, vines, and fruit trees are cultivated. The islands extend about 21 miles in a north-easterly and south-westerly direction, and a number of villages are scattered about Jezirat el Kerkenah, but there is only one on Gharbi.

Ras Sidi Yussuf (the western extreme of Gharbi) (*Lat. 34° 41′ N., Long. 10° 58′ E.*) is a small white cape on which is a tomb; the whole coast is a succession of rocky points and sandy bays. On the north-west point, nearly 1½ miles from Ras Sidi Yussuf is Burj el-Shemma, a round tower on an elevation of 40 feet above high water, the highest point of the island.

The highest object of the group is the ruined Burj el-Ksar on an elevation, 70 feet above high water, on the west side of Jezirat el Kerkenah; on the north extreme is a tower, elevated about 20 feet; there are also several Sidis, and the whole group is thickly covered with date palms. All parts of the shore can be approached by boats over the extensive outlying banks (which dry up in several places), and there is a narrow boat passage between Jezirat el Kerkenah and Gharbi.

Anchorage. — Vessels may anchor in about 6 fathoms south-eastward of the Kerkenah banks, their extent forming a good protection; the position of the bank is marked by the fishing stakes erected at the edge and beacons. The holding ground is generally good, but it is prudent to anchor with a long scope of chain, as in places there is a thick mattress of weeds which might prevent the anchor from gripping the bottom.

General charts 2158a, b, 449.

Chart 249, Mahedia to Ras Makhabez. Var. 8° 20′ W.

Beacons.—The following beacons are erected on the outer edges of the banks surrounding Kerkenah islands:—

Maruka, 26 feet high, of iron, situated 20 miles south-eastward of Ras Kapudia.

El Barani, 36 feet high, of iron, 7 miles south-south-eastward of the former.

El Mzebla, 26 feet high, of iron, 5¾ miles south-eastward of the former.

Sakit Hamida, 26 feet high, of iron, 7 miles south-westward of the former.

Wadi bu Zrara, 25 feet high, of iron, 5 miles west-south-westward of the former.

Wadi Mimum, 40 feet high, of iron, 8 miles westward of the former.

Ras El Besh (*Lat. 34° 34′ N., Long. 10° 58′ E.*), 26 feet high, of iron, situated 7 miles southward of Ras Sidi Yussuf.

There is also a wooden beacon, 50 feet high, on Ras Smum, the southern extreme of Gharbi island; another one, of same material and same height, on Burj Ferkiek, near the north-eastern end of Jezirat el Kerkenah.

The wooden beacons are surmounted by rectangular topmarks in open work, the spaces showing as horizontal stripes.

With the exception of Wadi bu Zrara, which has a cylindrical topmark, and Wadi Mimum, which is surmounted by a ball, all the iron beacons are provided with rectangular topmarks, the spaces showing as vertical stripes.

Two small iron screwpile beacons, 8 feet in height, surmounted by cages painted red seaward and black towards the land, and in a depth of 6 feet, mark the eastern side of the channel of the Wadi Mimum.

Light-buoys.—The following light-buoys are placed to mark the northern, eastern, and southern edges of the shoal water surrounding Kerkenah islands.

The buoys are conical, and about 15 feet in height, and the numbering is such that a vessel, skirting the bank from the northward towards Sfax, will pass Nos. 1 to 7 consecutively. The number is marked on opposite sides of each buoy.

No. 1, black buoy, moored in 7 fathoms water, situated 5¾ miles north-north-eastward of Maruka beacon, exhibits a *fixed red* light, which is visible from a distance of 5 miles.

No. 2, black buoy, moored in 7½ fathoms water, 1¼ miles southward or within a 2½-fathoms patch 5 miles south-eastward of the preceding buoy, exhibits a *fixed white* light, which is visible from a distance of 8 miles.

General charts 2158a, b, 449.

Chart 249, Mahedia to Ras Makhabez. Var. 8° 20′ W.

No. 3, black buoy, moored in 8 fathoms water, 7 miles south-eastward of the preceding buoy, exhibits a *fixed red* light, which is visible from a distance of 5 miles.

No. 4 buoy, with red and white horizontal bands, moored in a depth of 9 fathoms, 5½ miles eastward of El Mzebla beacon, exhibits an *occulting white* light *every fifteen seconds*, the *eclipses* being of *five seconds* duration, and it is visible from a distance of 8 miles.

No. 5, black buoy, moored in 10 fathoms water, 4¼ miles southward of Sakit Hamida beacon, exhibits a *fixed white* light, and is visible from a distance of 8 miles.

No. 6, black buoy, moored in 6½ fathoms water, 5¾ miles southward of Ras Smum beacon, exhibits a *fixed red* light, which is visible from a distance of 5 miles.

No. 7, black buoy (*Lat. 34° 28′ N., Long. 10° 56′ E.*), moored in a depth of 6½ fathoms, 7½ miles south-westward from the preceding buoy, exhibits a *fixed white* light, which is visible from a distance of 8 miles.

Directions.—From the northward, after passing Kuriat islands, a course should be shaped to pass 2 or 3 miles eastward of light-buoys, Nos. 1—3, remembering that the tidal streams set obliquely across the course; on one of the buoys being recognised the courses may be shaped from buoy to buoy. The Kerkenah islands will not be made out until No. 5 buoy is passed, as the palm trees on the islands will be barely distinguished from a distance of more than 10 miles; in bright sunlight several marabuts may be seen, but it is difficult to locate them, and the mark most easily recognised will be Burj el Ksar, a round lump which may be seen from a distance of 12 miles.

If the buoys are not seen, vessels should keep outside the 10-fathoms line, and the lead should be continually used.

Coming from the eastward it is preferable to approach south of the islands on the parallel of No. 7 buoy, and from the southward a sailing vessel with an easterly wind should steer to pass 5 miles eastward of No. 4 buoy, but in all cases the use of the lead should not be neglected.

Tides.—At the north extreme of the Kerkenah islands it is high water, full and change, at IVh. 32m.; springs rise 2 feet, neaps 1½ feet.

On the south side of Jezirat el Kerkenah, south of Burj el Ksar, it is high water, full and change, at IIIh. 27m.; springs rise 3¼ feet, neaps 2 feet.

Kerkenah channel.—The Kerkenah islands are separated from the coast, southward of Ras Kapudia, by a channel about 30 miles in length, only available, with the aid of buoys, for vessels drawing about 9 feet water; the channel ends to the southward, at Sfax road.

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Chart 249, Mahedia to Ras Makhabez. Var. 8° 20′ W.

Light-buoy.—A black light-buoy, marked No. 0 in white letters, is moored in the fairway, in about 4 fathoms water, about 13 miles northward of the northern extreme of Jezirat el Kerkenah, and exhibits a *fixed green* light, which is visible in clear weather from a distance of 4 miles.

Buoyage. — The following buoys are moored in the Kerkenah channel: —

Red buoys, with even numbers, mark the mainland side of the channel; black buoys, with odd numbers, the islands side; therefore when entering from the northward, red buoys are on the starboard hand and black buoys the port. All the buoys are conical in shape, and each have their numbers marked. Nos. 1 and 2 lying, respectively, south-east and north-west of the light-buoy, are much smaller than the others; the other buoys, Nos. 3 to 7, are about 13 feet high, and surmounted by truncated cones of open framework, the openings between the strips being horizontal.

Boat channel.—Burj el Ksar.—The only accessible point at Jezirat el Kerkenah for vessels of 6 feet draught is at Burj el Ksar, on the western side. The channel leading to it begins at 1½ miles north-eastward of No. 7 buoy, whence the course is 130° true direct to Burj el Ksar, which, from near the buoy, appears like a table top above the horizon. The anchorage is 2 cables westward of the Burj.

Coast. — From Ras Kapudia to Ras Sidi Mansur, distant about 30 miles, the coast is low; the two villages of Mellulesh and Luza, the former 7½, the latter 15 miles from the cape, stand near the coast. At Luza the land forms a small dark wooded point, which is conspicuous seaward. The ground is generally cultivated and wooded, with a few Sidis, and scattered houses; at the back is a range of hills elevated from 300 to 400 feet above the sea.

Abreast of Mellulesh the bank extends out a distance of 10 miles, and is so shallow that the shore cannot be approached even by boats except at high water.

Ras Sidi Mansur (*Lat. 34° 50′ N., Long. 10° 53′ E.*) is a sandy point (recognised by a ruined tower) about 60 feet above the sea, near which is a Sidi. A bank, on which there are fish weirs, projects about 3½ miles south-eastward of the point; from the end of which a vein of deeper water, about 2 miles in width, in which there are irregular depths of from 8 to 3¾ fathoms, extends in a north-north-east direction into the Kerkenah channel.

Tidal stream.—In Kerkenah channel the tidal stream generally follows the direction of the channel, setting to the south-westward with a rising tide and to the north-eastward with a falling tide at a rate of from one to 1½ knots an hour.

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Plan 1162, Sfax roadstead. Var. 8° 30′ W.

SFAX ROAD.—The southern part of the channel between the Kerkenah islands and the mainland form Sfax road, which can only be approached, by large vessels, from the southward.

Ras Tina, 6 miles southward of Sfax, is low, but two hillocks lie to the westward of the point with the ruins of ancient Thenæ, and a large plain extends in the same direction. Ras Sfax, also low, is 3 miles north-eastward of Ras Tina. The 5-fathom line is about 1½ miles off these points, but owing to the low land an estimate of the distance should not be trusted to in passing them.

LIGHT (*Lat. 34° 39′ N., Long. 10° 41′ E.*).—A cylindrical tower, 145 feet in height, with a square dwelling near it, is situated on a hill, 1½ miles westward of Ras Tina, and exhibits, at an elevation of 182 feet above high water, a *group flashing white* light *every ten seconds*, showing a flash for *one-tenth of a second;* eclipse of *two and four-tenths seconds;* a flash of *one-tenth of a second;* eclipse of *seven and four-tenths seconds;* it is visible in clear weather from a distance of 20 miles.

Port. — The artificial harbour of Sfax consists of a basin about 30 acres in area, and a total quayage 1,500 yards long, on which there are three 3-ton travelling cranes, and two 7-ton stationary cranes.

Canal.—A canal, about 1½ miles in length, 110 yards in width at the entrance, and 72 feet in width on the platform, dredged to a depth of 21 feet, and having a north-easterly direction, forms the means of communication between the roadstead and the basin.

Depth.—The depth in the canal is 21 feet, in the port alongside the quays 20 feet, in the boat canal northward of the ship canal 10 feet.

LIGHTS. — On the new quay of the port a *fixed red* light is exhibited, at an elevation of 52 feet above high water, from a metal frame over a masonry watch-tower, 46 feet in height; it is visible in clear weather from a distance of 6 miles. This light is on the axis of the canal.

Nine *fixed* unwatched lights, shown from masonry towers, mark the edges of the canal, those on the starboard hand being *white*, and those on the port hand *red*.

These lights are placed in pairs, with the exception of the ninth light, which is on the port side of the canal, at the entrance to the basin.

Light-buoys.—Two light-buoys are moored at the entrance to the canal, the one on the starboard hand exhibiting a *fixed white* light, and the one on the port hand a *fixed red* light.

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Plan 1162, Sfax roadstead. Var. 8° 30′ W.

Buoys.—Two conical buoys mark the bank at the widened part of the canal, that on the starboard hand being red, and that on the port hand black. They lie midway between the light-buoys at the entrance and the first pair of fixed lights.

Boat canal.—A canal for small vessels and boats is dredged to a depth of 10 feet at low water, and there is a quay 150 feet long on the south-western side of the port, with a depth of 13 feet, where they can go alongside; it is entered about half a mile northward of the entrance to the ship canal, and the minaret in line with the New quay lighthouse, bearing 309° true, leads through.

Pilots.—There is a service of pilots for the canal, and pilotage is compulsory for all vessels of over 100 tons; vessels must wait for a pilot in the roadstead. The pilot boat is moored a quarter of a mile seaward of the buoys marking the entrance to the canal.

Signals. — The following signals relative to the canal are made from the pilot station:—

By day.—A pennant over a flag.—Anchor in the road, the canal is engaged.

Flag over a pennant.—The canal is clear, you can enter.

Two balls.—Water falling.

One ball.—Water rising.

Flag.—Go slowly, the vessel, entered before you, is not secured.

Pennant.—The vessel is secured, you may enter.

By night. — Two *white* lights placed vertically. — The canal is clear, you may enter.

Three lights, *red*, *white*, *red*, placed vertically.—The water is falling.

Two lights, *white* below *red*, placed vertically.—The water is rising.

Two lights, *red* below *white*, placed vertically.—Go slowly.

A vessel grounding in the canal must by day hoist a red broad pennant, and at night a *red* light at the masthead; a red broad pennant, hoisted half mast by day, and *two red* lights at the masthead by night indicate that the vessel is afloat.

Anchorage (*Lat. 34° 41′ N., Long. 10° 50′ E.*).—The anchorage off Sfax is protected by the Kerkenah islands from the heavy sea produced by easterly winds. It is necessarily some distance from the town, but can be chosen according to the depth of water required, with the minaret bearing 309°, in from 5 to 6 fathoms, over a bottom of mud; good holding ground. Ground covered by weeds and indicated by the smooth water which covers them should be avoided, as the anchors will not hold.

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Plan 1162, Sfax roadstead. Var. 8° 30′ W.

A good anchorage for a vessel drawing about 18 feet water is on the same bearing, in a depth of about 21 feet, about 3 cables north-eastward of the light-buoys at the entrance to the canal.

Directions.—Approaching the coast from the eastward the hills, from 330 to 490 feet high, and situated nearly 10 miles from the coast, may be seen, also, in clear weather, Sidi Buktir marabut on the southern hill; a square building northward of this, and further north Tuel Shridi, a rounded hill, 433 feet high, but these objects are frequently distorted by mirage or hidden by mist.

About 3½ miles northward of Ras Mahara are the two marabuts of Sidi Bu Akazin, and 4 miles north-east of this an isolated palm near the coast is conspicuous.

Town (*Lat. 34° 43′ N., Long. 10° 47′ E.*).—Sfax (the ancient Taphrura) is enclosed within high walls, well built, with paved streets, and had a population of about 70,000 in 1910, of whom 1,000 were fishermen. A British Vice-Consul is resident. A high tower and minaret form conspicuous objects, well seen from the sea. (*See* view on plan.) Upon the coast on both sides are several guard-houses, and for at least 10 miles on either side of the town, along the seashore, are country houses of the natives, each in large and fruitful gardens; the country around is well wooded, and backed by a range of hills at about 10 miles distant.

Communication.—Steamers every week to Marseille, Malta, Naples, and Tripoli, and twice every week to Tunis and Tunisian ports. A railway, 151 miles in length, connects Sfax and Metlaoui, and a line is under construction from Susa to Sfax. Telegraphic communication with all lines. *See* also page 18.

Coal and supplies.—About 11,000 tons of coal and patent fuel are kept in stock; and there are 36 lighters; 300 tons can be put on board in 24 hours. There is no coal wharf, but vessels can load at a quay which is 400 feet long and has 19 feet alongside, and lies near the coal store.

Supplies of meat are plentiful, poultry and bread may be obtained, but vegetables are scarce; the water brought from wells and tanks 4 miles from the town is hard and brackish; pipes are laid on to the quay.

Trade.—Sfax contains manufactories of linen, and boats for the coasting trade are also constructed here. The trade, which is actively carried on with Malta and Sicily, consists of oil, esparto grass, phosphates, sponges from the adjacent islands of Kerkenah, carilla, wool, and barley; fruit and vegetables are grown in the surrounding district. Cucumbers, locally called sfakous, are said to give the name to the

Plan 1162, Sfax roadstead. Var. 8° 30′ W.

town. From 150 to 200 large Greek fishing boats visit Sfax annually for the sponge fishing.

Shipping. — In 1910, 772 steam vessels, with a total tonnage of 823,380 tons, entered the port, and 1,433 sailing vessels, with a total tonnage of 36,366 tons.

Life-saving station.—A rocket apparatus is maintained at the port.

Submarine telegraph cables. — There are cables to Susa and Jerba.

Buoy.—A white buoy is moored 1¾ miles southward to the light-buoys at the entrance to the canal to mark the line of cable.

Tides.—It is high water, full and change, at Sfax, at IIIh. 47m.; springs rise 5¼ feet, neaps 3½ feet, a rise and fall unusual in the Mediterranean. It is much affected by the wind.

Tidal streams.—The stream sets to the north-eastward with a rising tide, and to the south-westward with a falling tide, at rates varying from 1½ knots to half a knot an hour; but the direction and strength is much affected by the wind.

COAST. — Southward of Ras Tina the coast forms a bay about 2 miles deep, on the low shore of which is a guard-house, a remarkable palm tree, several tombs, and the village of Nakta, 2 miles from Ras Mahara (*Lat. 34° 32′ N., Long. 10° 35′ E.*), the land within being slightly undulating and partially cultivated; two reservoirs, situated 1½ miles south-westward of the village of Nakta, are conspicuous; they consist of grey sheet-iron cylinders mounted on white masonry pillars. The coast from Sfax as far as Ras Mahara is fringed by dry and shallow banks which extend out about a mile, and a depth of 5 fathoms is at distances varying from one mile to 2½ miles; along the margin of the flats are numerous fishing weirs. The Wadi Shaffar runs into the sea at Ras Mahara.

Chart 249, Mahedia to Ras Makhabez.

GULF of GABES. — This indentation, ancient Syrtis Minor, lies between the Kerkenah islands on the north and Jezirat el Jerba on the south, and is 42 miles across the entrance, and nearly 50 miles deep. There is a moderate depth of water over the whole gulf, the 10-fathoms line being about 12 miles south of the Kerkenah islands, and the same distance north of Jezirat el Jerba, gradually increasing from each side to 30 fathoms in the centre, with depths of from 12 to 20 fathoms at about 10 miles from the shore.

In the neighbourhood of the villages the land is well cultivated, and there are extensive plains affording pasture for sheep and cattle. Near the coast the low undulating land presents no marked feature, but inland, on the north-west, there is a long chain of mountains named Jebel Tielth, nearly 20 miles distant, which attains a con-

Chart 249, Mahedia to Ras Makhabez. Var. 8° 40′ W.

siderable elevation; on the south the higher range is farther off. There are a few small lakes and streams near the shore on the north-western side of the gulf.

Ras Mahara (*Lat. 34° 32′ N., Long. 10° 35′ E.*) may be considered as the southern boundary of Sfax road; near it the water is deeper, there being 5 fathoms within a mile of the shore. North of the point the country is well wooded; and on the west the shore is broken by a shallow, sandy islet. North-westward, a distance of 10½ miles from the point, is Sidi Buktir, a tomb on the summit of a ridge 482 feet above high water, forming a good mark in this otherwise level country. The village of Mahares is on the coast 5 miles to the westward of the point, and may be recognised by the ruined fortress in the centre. The inhabitants, numbering about 400, are chiefly occupied in fishing, the weirs extending off the shore on both sides of the town.

Anchorage.—There is anchorage off Mahares at about 2½ miles from the shore, in 5½ fathoms water, with the ruined fortress bearing about 328° true, and the point 48° true.

Ras Ungha. — Burj Ungha, a large square fort with four round and four square towers, stands close to the sea about 5 miles from Mahares, and 3 miles south-westward from it is Ras Ungha, whence banks again extend from the coast and enclose a group of small islands.

Landmarks. — The principal landmarks in the gulf are to the northward the chain of Bu Hedma, the most distant from the coast and most frequently obscured by mist; it presents two large and distinct summits 2,559 and 2,444 feet high with a lesser summit 1,214 feet high, which, seen from the southward, appears conical.

To the westward near the sea are the summits of Jebel Rumana, 535 feet high, and Jebel Meida, 886 feet high, the latter showing two flat tops. Jebel Dissa, 459 feet high, further south, is surmounted by a remarkable building.

Jebel el Haluga, 748 feet high, and situated 10 miles westward of Gabes, may be known by its sharp conical peak.

In the south the great chain of Jebel Metmata has to the west Sommet Ballon, 1,837 feet high, and further south-eastward Smerten, 2,343 feet, terminating further south-eastward by the conical mountain Kef Demœr, 2,267 feet, north-eastward of which is Jebel Tajera, 896 feet high, and surmounted by a building.

Îlots Sur-Kenis consists of Îlot Neiss, 20 feet above high water, swampy, and 1½ miles in length surmounted by a survey mark, and three small islets named Îlot du Nord, Îlot du Centre, and Îlot due Sud: Îlot Neiss lies 3½ miles in a south-westerly direction from Ras

Chart 249, Mahedia to Ras Makhabez. Var. 8° 50′ W.

Ungha, and has several ruins on it. The islands form a group extending about 4 miles in a northerly and southerly direction, and are surrounded by banks formed of sand, mud, and weeds, and dry, forming pools of deep water connected by shallow passages, known and used by coasting vessels.

Extending to the south-westward of Îlot du Sud, a distance of 7 miles, these banks form a point, dangerous on account of its steepness, as there is a depth of 13 fathoms within the distance of half a mile. From this point the edge of the bank bends to the northward for about 5 miles, and affords shelter from the seas produced by easterly winds.

Beacons. — Two iron-screw pile beacons, surmounted by cages which are painted red seaward and black towards the land, and elevated 8 feet above high water, are placed on the south-eastern edge of the bank, the northern being in a depth of 5 feet, and the southern 4 feet. The northern one is situated 3 miles eastward, and the southern one 3¼ miles southward of Îlot du Sud.

Buoy.—The southern extremity of the bank is marked by a red spindle buoy, and lettered S.K., but it is hard to see.

Coast. — Between Ras Ungha and Khedim peninsula, 12 miles west-south-westward the coast is low and marshy with some lakes, and the Wadi Rann and the Wadi Kelba flow into the sea, their channels passing through parts of the Bancs Sur-Kenis.

Southward of Khedim peninsula the coast changes to one of clay cliffs of about 65 feet in height, with several deep ravines, to a little beyond Burj Nadur. The tower or fort, a ruin at the edge of the cliff, is 50 feet in height, and 128 feet above high water, forming an excellent mark. There is a depth of 4 fathoms within half a mile of the cliff, and 10 fathoms at 2 miles beyond.

Baie des Sur-Kenis.—The deep water bight, formed westward of Îlots Sur-Kenis and banks, affords good sheltered anchorage. The land at the approaches being very low and nearly devoid of marks, great care and attention to the lead is necessary; Burj Nadur, bearing 283° true, leads to the southward of the southern point of the shoals from the islands.

SKIRA is an important entrepôt for esparto grass, which grows in abundance on the slopes of Bu Hedma, and the port, situated on the shore of Baie des Sur-Kenis, about 4 miles northward of Burj Nadur, has a direct trade in esparto grass with the United Kingdom; there are several ruins in the vicinity, and numbers of buildings on the shore.

Light (*Lat. 34° 17′ N., Long. 10° 5′ E.*). — About half a cable northward of the Custom-house a *fixed red* light is shown, at an eleva-

Chart 248, Mahedia to Ras Makhabez. Var. 8° 50′ W.

tion of 72 feet above high water, from a white square tower, 33 feet in height, surmounting a dwelling; in clear weather it is visible from a distance of 4 miles.

Anchorage. — The anchorage, about half a mile from the shore in depths of 3½ to 4 fathoms, over clay, sand, and coral, is sheltered from all winds.

Directions.—A vessel coming from the northward will pass to the eastward of the banks by not going into less than 9 fathoms water, and in clear weather the summits of Jebel Meida should be distinguished, the northern summit of which, bearing 251° true, will lead southward of the bank until Burj Nadur bears 283° true, which clears the shoal water extending from the south-west point.

Communication.—There is a telegraph station at Skira.

Supplies. — The country affords few resources; the water, obtained from wells near the Custom-house, is not of good quality.

Landing can only be effected on the beach before the lighthouse.

Tides.—It is high water, full and change, at Baie des Sur-Kenis, at IIIh. 58m.; springs rise 6½ feet, neaps rise 4½ feet.

Coast. — A large marshy lake lies behind the low coast south of Burj Nadur, separated from the sea by a sandy isthmus through which two small streams enter the sea; Wadi Umm el Gramme, the southern, has about one foot water on its bar and 13 feet inside. Between this and the Wadi Akarit, a stream with a similar depth on its bar, and situated 3½ miles southward, a bank of mud and weeds extends off-shore, with depths of 2½ fathoms at 1½ miles distant.

The mouth of the Wadi Akarit is between two small cliffs, and eastward, distant 2¼ miles from it, there is a shoal with 2¾ fathoms water over it.

At Tarf el Ma, 3 miles further south, there are two ravines, several ruins, and a sandy beach, and 4 miles further on Wadi Mela runs into the sea; on its banks an agricultural colony is established, and there are numbers of artesian wells, also several buildings, the largest being 330 feet in length, and, with its red roof, is visible a considerable distance. About 4 miles westward of the mouth, Udref village, with about 400 inhabitants, has a minaret and several marabuts, and about the same distance south-westward Mtuia village, with a population of about 500, and a minaret. Off Wadi Mela, the 5-fathoms contour line is about 1¼ miles from the shore.

GABES (*Lat. 33° 54′ N., Long. 10° 7′ E.*), a town of considerable size, defended by a well-built fort or tower and partly built on the site of ancient Tacape, is situated a little within the coast, upon the Wadi Gabes, and with the large villages of Menzel and Jara has an

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Chart 249, Mahedia to Ras Makhabez. Var. 8° 40′ W.

estimated population of 20,000. A British Consular Agent is resident. The bar of the Wadi Gabes uncovers about 3 feet at low water, and forms the port, in which there is a depth of 5 feet, protected at its entrance by two stone embankments.

LIGHTS (*Lat. 33° 54′ N., Long. 10° 7′ E.*).—On the south point of the entrance to the river, a rectangular building, with an octagonal stone tower, 36 feet in height, exhibits, at an elevation of 42 feet above high water, a *fixed white* light, which in clear weather is visible from a distance of 10 miles. For arc of visibility, *see* Light list and chart.

A *fixed white* light is shown from the north pier, and *fixed red* light from the south pier; these lights, exhibited at an elevation of 20 feet above high water, are visible in clear weather from a distance of 4 miles.

A *fixed red* light, shown near the signal mast, at an elevation of 19 feet, prohibits entry to the roadstead in bad weather, and is visible in clear weather from a distance of 2 miles.

Buoys. — An isolated bank, with 14 feet over it, lying off the wharf, is marked by a red spindle buoy, surmounted by a bell, moored in a depth of $2\frac{3}{4}$ fathoms, and a red buoy marks the fairway of the channel into the port.

Anchorage, with good holding ground, may be obtained in 4 fathoms water, with the cone of Jebel el Haluga in line with the landing stage, bearing about 240° true, and the summit of Jabel Meida in line with Grenush oasis, bearing 312° true; in summer, with easterly winds, communication with the shore is frequently difficult and often impossible.

Communication.—Steamers twice a week to Tunis, calling at Jerba and intermediate ports, and steamers weekly to Tripoli; telegraphic communication with all lines.

Coal and supplies.—A small supply of coal (about 25 tons) is kept in stock, and some fresh provisions may be obtained; the water, from the Wadi Gabes, is quite fresh, but hard with an unpleasant taste.

Life-saving station. — A rocket apparatus is maintained at Gabes.

Trade.—The principal article of commerce is the red dye named hennah (Lawsonia inermis), the plant from which it is procured being extensively cultivated in the neighbourhood.

Shipping. — In 1910, 224 steam vessels, with a total tonnage of 232,197 tons, entered the port, and 611 sailing vessels, with a total tonnage of 5,672 tons.

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Chart 249, Mahedia to Ras Makhabez. Var. 8° 30′ W.

Submarine telegraph cable.—A cable connects Gabes with Humt-Suk, Jezirat el Jerba.

Landing may be effected at a landing stage about 1½ cables southward of the Wadi Gabes, but with winds from seaward it is not always possible to get alongside the slips.

Tides.—It is high water, full and change, at Gabes, at IVh. 3m.; springs rise 7¼ feet, neaps 5 feet.

Coast. — A line of sandy hillocks borders the coast for 4 miles south-eastward of Gabes to the Wadi Srag, and between this and the village of Zarat (*Lat. 33° 39′ N., Long. 10° 21′ E.*), 14 miles further in the same direction, there are no conspicuous marks, except the marabut of Sidi Marmora, surrounded by ruins, and situated about 2 miles northward of the village. There is a spring of cold water at Zarat, and further inland, at the oasis of Mareth, there is one also.

Between the Wadis Srag and Zarat the coast is bordered by a bank which uncovers generally about a quarter of a mile from the shore, and at 3½ and 4½ miles south-eastward of Wadi Srag, patches with depths of 3 fathoms over them, lie one mile and 1½ miles off the coast respectively.

About 3 miles eastward of Zarat the Wadi Zigzan enters the sea, and here is a conspicuous storehouse for esparto grass. Eastward of this a large lake, named Sebkha Mezessar, forms the delta of the Wadi Mezessar and the Wadi Zœss, the former having about 1½ feet on the bar at its entrance, but within them is a sinuous channel in the middle of the marsh, in which the depths are 20 feet; 4 miles further east is Gurin, where there is a channel of from 10 to 13 feet, but barred at the entrance; a hill, 53 feet above high water, on the west side of the entrance, and a shed for esparto grass, are conspicuous.

From Gurin the coast rises for 8 miles to Tarf el Jorf cliffs, about 60 feet above high water, and the cliffs which border the Bogaz Adjim are formed of red clay, and visible from a distance of 7 or 8 miles.

Beacons.—Two small pyramid beacons on the borders of the cliffs, used for placing the buoys in position, being only about 6 feet in height, are not easily distinguished.

JEZIRAT el JERBA, about 16 miles in length east and west, 17 miles north and south, and irregular in outline, especially on the southern side, comprises a coastline of about 85 miles in circumference, very much broken up, being sometimes bordered by rocks with sandy beaches at intervals.

The island is fertile, with thick plantations of date and olive trees: upon the coast are several forts and villages, while neat looking white cottages are scattered over the country; including 5,000 Jews, it con-

Chart 249, Mahedia to Ras Makhabez. Var. 8° 30′ W.

tains about 45,000 inhabitants who were originally Berbers, belonging to a particular religious sect; they are very hospitable.

There is a considerable trade in shawls, very fine woollen goods, oil, and fruit, also a large pottery, the trade being mostly in the hands of British subjects, who form a considerable colony; the island still produces the lotus, from which it derived one of its ancient names, Lotophaji.

West coast.—On the west coast of Jerba, in the neighbourhood of Bogaz Adjim, which separates Jerba from Tarf el Jorf, a small square marabut, may be seen on Jezirat Kattaya, and on the coast of Jezirat Jerba, distant 1½ miles from the former, a cylindrical marabut at Sidi Tusserk; Sidi Yaya, 2 miles north, may be recognised by two kobas, and 3 miles further north on the coast there is a square building at Sidi Jamur.

Burj Jilij, the north-west point, is a small square fort, which should be visible from a distance of 15 miles, about midway inland there is a remarkable olive tree in the form of a mushroom, only visible from certain directions.

LIGHT (*Lat. 33° 53′ N., Long. 10° 45′ E.*). — On the north-west angle of Burj Jilij, an octagonal tower, 40 feet in height, exhibits, at an elevation of 59 feet above high water, a *flashing red* light *every five seconds*, which shows a flash of *one-tenth second* duration followed by an eclipse of *four and nine-tenths seconds;* it is visible in clear weather from a distance of 13 miles.

North coast.—Bank.—Between Burj Jilij and Ras Remeul, about 10 miles eastward, the north coast is bordered by a very large bank of mud and weeds, the 10-fathoms line being 10 miles from the coast; and depths of 2 fathoms about 4 miles north of Humt-suk. The depths are very irregular in front of Humt-suk, with a large number of small holes. A bank studded with heads with from 3 to 6 feet water over them, hard bottom, surrounds Ras Remeul, extending for 3½ miles in a northerly direction, and a heavy choppy sea sets up on it with the least wind.

Buoy.—A black spindle buoy, with the letters R.R. in white on it, and a cylindrical topmark, is moored on the northern edge of Ras Remeul bank.

Humt-suk, about 6 miles east-south-eastward of Burj Jilij, although most inconveniently situated as regards communication with vessels, is the centre of commercial operations of Jerba, and a British Consular Agent is resident. The anchorage is 4 miles from the shore, and communication by boat is long and difficult, as the banks cannot be crossed except between about 2 hours before, and 2 hours after, low

General charts 2158a, 449.

Chart 249, Mahedia to Ras Makhabez. Var. 8° 30′ W.

water. The Burj el K'bir, in front of Humt-suk, should be visible in clear weather from a distance of 15 miles.

LIGHT (*Lat. 33° 53′ N., Long. 10° 45′ E.*).—On the pier at Humt-suk a *fixed red* light is shown, at an elevation of 33 feet above high water, from an iron support on a masonry structure, 26 feet in height; it is visible in clear weather from a distance of 6 miles.

Pier.—There is a small iron landing pier, in front of the Custom-house, where boats can land at half tide.

Light-buoy.—A black buoy, surmounted with a white square topmark, and having "Djerba" on it in white letters, is moored in a depth of 4 fathoms, 4 miles northward of the pier, and exhibits, at an elevation of 14 feet above the sea, a *fixed white* light, which in clear weather is visible from a distance of 8 miles.

Anchorage may be taken up in the vicinity of the light-buoy, according to the vessel's draught of water; a good position for communicating with the shore is westward of the buoy, with Burj el K'bir bearing about 173° true.

Communication.—French and Italian steamers call weekly, sailing on Monday and Thursday, and there is communication with Gabes, Tripoli, and Malta; telegraphic communication with all lines.

Submarine telegraph cable.—Humt-suk is connected by telegraph cables with Sfax, Gabes, and Zarsis.

Tides.—It is high water, full and change, at Humt-suk, at IVh. 18m.; springs rise 4 feet; neaps 2¼ feet. At the anchorage it is high water half an hour earlier.

Ras Turgeuness may be recognised by the lighthouse, a small chain of limestone hillocks, showing white, and a clump of palms; several marabut towers will be seen both north and south of the cape. Between it and Ras Remeul, shoal water extends about a mile from the coast, the 5-fathoms line being 2 miles distant, and the cape is surrounded by a bank of rocks, which extends to the southward to Sidi Garus marabut, eastward of which a shoal, with 2½ fathoms water over it, lies one mile distant.

LIGHT.—Ras Turgeuness.—A cylindrical tower, 160 feet in height, with a rectangular dwelling attached, is situated on White hill, and exhibits, at an elevation of 210 feet above high water, a *flashing white* light *every five seconds*, and showing a flash for *one-tenth of a second;* eclipse, *four and nine-tenths seconds;* in clear weather it is visible from a distance of 21 miles.

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Chart 249, Mahedia to Ras Makhabez. Var. 8° 30′ W.

Aghir.—From Sidi Garus the coast turns to the south-westward for 7 miles to Burj Kastil, forming a bay, known as Mersa Aghir, and 3 miles in the same direction from Sidi Garus is the large village of Aghir, where there is a small square burj. Burj Kastil, at the extremity of a low peninsula, which is the termination of this side of the island, is a square fort, with towers, at each angle, and there are several marabut towers on the small hills, which may be seen from a distance of 15 miles.

Light.—Burj el-Aghir (*Lat. 33° 45′ N., Long. 11° 1′ E.*).—A masonry structure, 17 feet in height, on the north-east angle, exhibits, at an elevation of 22 feet above high water, a *fixed green* light, which in clear weather is visible from a distance of 3 miles. For arc of visibility, *see* Light list.

Anchorage.—Aghir affords probably the best anchorage on the coast of Jerba, being sheltered by the island from westerly winds, and from those from north, which prevail in winter; vessels anchor as convenient for their draught of water, and depths of 4½ to 5 fathoms are found, parallel to the coast, at a distance of 4 miles.

Communication. — There is telegraphic communication with all lines, through Humt-suk and Zarsis, and a carriage road to Humt-suk.

Supplies. — Fresh provisions may be procured, and water from wells and reservoirs.

Tides. — At Ras Turgeuness it is high water, full and change, at IIIh. 33m.; springs rise 3½ feet, neaps 2⅔ feet; and at Aghir the establishment is IIIh. 18m., springs rising 3 feet, neaps 2 feet.

Tidal streams.—On the west side of the island the stream sets southward towards the entrance of the Bogaz Adjim with a rising tide, and in a contrary direction about high water. On the north coast the streams run parallel to the coast; to the westward with a rising tide, and to the eastward about high water.

BAHIRET EL BU GRARA, or the small Sea of Bu Grara, is an extensive basin, about 14 miles in length in a north and south direction, and from 7 to 13 miles in width, which separates Jezirat el Jerba from the mainland; although much encumbered with shoal water, in its centre there is a large road, 6 miles in length and 2 in width, well sheltered, and with depths of from 3 to 8 fathoms.

Bogaz Adjim, the entrance from the north-west, consists of two passages, the western of which has a bar on which the depth is 9 feet; the other, to the northward has only 6½ feet, and although with less water, has the advantage of being more direct. Off Tarf el Jorf the channel becomes deep and widens towards Humt Adjim, but again

General charts 2158a, 449.

Chart 249, Mahedia to Ras Makhabez. Var. 8° 20′ W.

becomes shallow between the telegraph stations on Jezirat el Jerba and the mainland, with a depth of only 12 feet in the channel. Westward of the telegraph station is the detached islet Sidi Kattaya, southward of which a bank extends for a distance of $1\frac{3}{4}$ miles, here the channel widens, and is deeper, but is contracted again a little further on by two banks with only 4 feet and 6 feet over them.

Light. — Adjim Burj el Marsa (*Lat. 33° 43′ N., Long. 10° 44′ E.*). — A *fixed green* light is shown at the north-west angle from a rectangular structure of masonry, 19 feet in height, at an elevation 23 feet above high water, and is in clear weather visible from a distance of 3 miles. For arc of visibility, *see* Light list.

Beacons.—A black screw pile, surmounted by a cylindrical topmark, numbered 7, lies on the western edge of the bank in the middle of the channel between the two telegraph stations.

A black iron pile, surmounted by a cylindrical topmark, numbered 11, lies on the western edge of the bank that extends southward from Jezirat Sidi Kattaya.

Two red iron piles, surmounted by conical topmarks, numbered 10 and 12, mark the north and south ends of the small one-fathom bank near the inner end of the channel.

Buoys.—The outer part of the northern channel is marked by five spindle buoys, 6 feet in height, black on the port, and red on the starboard, hand entering, and numbered 1 to 5, the even numbers being red and odd black. The inner portion of the channel has four conical buoys, numbered 6 to 9, even numbers red, odd numbers black; the red buoys are surmounted by a conical, and the black buoys by a cylindrical, topmark. The buoys are subject to changes.

Caution is necessary, and the vessel should have the sun in a favourable position; the coral patches are of a light green colour, and can then be seen from the masthead.

Eastern entrance. — The eastern entrance to Bahiret el Bu Grara, between Burj Kastil and Ras Marmor, is very shallow, and 4 miles within are the ruins of a Roman causeway, which once connected the island and the mainland; the channel, through a gap in this, is about midway, near Burj el Bab.

Tides.—It is high water, full and change, in Bahiret el Bu Grara and the channels leading to it, as follows: —

Bogaz Adjim entrance at IVh. 23m.; springs rise $5\frac{1}{4}$ feet, neaps $3\frac{1}{4}$ feet.

Humt Adjim at IVh. 48m.; springs rise $3\frac{1}{4}$ feet, neaps 2 feet.

Inner bar at VIh. 15m.

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Chart 249, Mahedia to Ras Makhabez. Var. 8° 20′ W.

Bahiret el Bu Grara at VIIh. 40m.
Burj Kastil at IVh. 3m.
Burj el Bab at VIh. 3m.

Tidal streams.—At Bogaz Adjim northern channel the east-south-easterly stream commences at the entrance at 4 hours before high water, and attains its maximum strength at one hour before high water, when its direction is about south-south-east, after which it has a more southerly direction. The west-north-westerly stream, commencing 2 hours after high water, turns to the northward at 5¼ hours after high water, and attains its greatest velocity. On the bar the easterly stream commences about 6½ hours before high water, and attains a rate of 2 knots, and the westerly stream commences about high water and attains a rate of 2¾ knots at spring tides; there is slack water for about half an hour.

Humt Adjim village, on the northern side of Bogaz Adjim, has anchorage off it, but the tidal stream runs about 3 knots at springs; there is a landing place near the Burj, but it cannot be used near low water. Some supplies can be procured here, and also good water from a tank near the Burj, which holds always 30 to 40 tons. An abundance of water may also be procured from artesian wells at Adjim, but it is not drinkable.

Coast.—From Ras Marmor, on the south side of the eastern entrance to Bahiret el bu Grara, the coast to the southward is low with some sandhills, from 100 to 130 feet in height, behind it, and fronted by shallows which extend upwards of a mile off-shore, but off Zarsis, 8 miles southward, the depths gradually decrease towards the shore, and landing is effected without difficulty.

Zarsis, ancient Gergis of the Romans, is a village principally of sponge fishers, the inhabitants belonging to a tribe of Accaras; there is a Custom-house and fort.

LIGHT (*Lat. 33° 30′ N., Long. 11° 7′ E.*).—A white octagonal tower, 50 feet in height, with a rectangular base, stands close to the Custom-house, and exhibits, at an elevation of 53 feet above high water, a *fixed red* light, which in clear weather is visible from a distance of 6 miles.

Beacon.—A beacon, 9½ feet above high water, consisting of a masonry tower, surmounted by a red topmark, stands on the extreme of a rocky bank situated 2¼ cables south-south-eastward of the light-house.

Anchorage may be obtained in a convenient depth, according to the vessel's draught, south-eastward of the Custom-house; boats can land at all times at a small jetty.

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Chart 249, Mahedia to Ras Makhabez. Var. 8° 20′ W.

Supplies.—Fresh provisions may be procured at Zarsis and water from river.

Tides. — It is high water, full and change, at Zarsis, at IIIh. 13m.; springs rise 3 feet; neaps 2 feet.

Coast.—Between Zarsis and Ras Ashdir, 30 miles south-eastward, the coast is low, and backed by large lakes; to seaward, shoals extend nearly 12 miles, and Zira spit, the north-eastern extreme of El Biban bank, awash in places, lies east-south-eastward, distant 12½ miles from Zarsis lighthouse.

Beacon.—A truncated conical masonry tower, with a red conical topmark, the summit of which is 18 feet above high water, lies in 1½ fathoms of water about a mile inside the end of Zarsis spit; 5 fathoms will be found at a distance of 1½ miles, and 10 fathoms at a distance of 2½ miles, northward of the beacon.

Boundary.—Ras Ashdir marks the boundary between Tunis and Tripoli.

The description of the coast of Tripoli is given in Mediterranean Pilot, Vol. II.

General charts 2158b, 449.

CHAPTER VII.

THE SICILY AND MALTA CHANNELS; THE MALTESE ISLANDS; THE ÆGADEAN ISLES, AND THE WEST AND SOUTH COASTS OF SICILY.

(*Lat. 38° 15′ N. to Lat. 35° 25′ N.*)
(*Long. 10° 20′ E. to Long. 15° 10′ E.*)
VARIATION IN 1912.—Decreasing about 7′ annually.

Chart 250, Fratelli rocks to Mahedia. Var. 8° 50′ W.

SKERKI BANK.—An extensive bank, composed of rock, sand, coral, and shells, lies in the fairway channel between the coasts of Tunis and Sicily, and extends, with less than 100 fathoms water on it, about 36 miles in a north-easterly and south-westerly direction.

Keith reef (*Lat. 37° 50′ N., Long. 10° 57′ E.*), the shoalest spot on Skerki bank, is of compact limestone, nearly half a mile in length, and a third of a mile in breadth, with a space of about 6 feet square covered with weeds, nearly awash, which generally breaks. On the north side of the crown of the reef there is 2 fathoms water, 8 fathoms on the eastern, and 14 fathoms on the western side. All round the reef, at the distance of 2 cables, there are depths of 17 fathoms, deepening suddenly to 40 fathoms.

Biddlecombe patch, 2 miles to the northward of Keith reef, is about a cable in extent, with 4½ fathoms water on it, and from 23 to 45 fathoms between. About a mile south-east of Keith reef, and the same distance north-west of Biddlecombe patch, there is a depth of 100 fathoms. In approaching, the water is clear and the bottom distinctly seen at a considerable depth. In calm weather the sea does not break, and then the reef is not visible.

Hecate patch, with a depth of 4 fathoms, lies 6¾ miles south-westward of Keith reef. Three-quarters of a mile north-westward of Hecate patch is Locust patch, with 9 fathoms least water. Within an area of a mile from Hecate patch there are from 9 to 50 fathoms; to the southward the water deepens rapidly.

Sylvia knoll.—During the examination of Skerki bank made by H.M. surveying vessel *Sylvia* in the year 1885, a knoll was found near the north-east extremity of the bank. This, named Sylvia knoll, has

Chart 250, Fratelli rocks to Mahedia. Var. 8° 50′ W.

a depth of 7 fathoms, with 25 to 28 fathoms close-to, and lies 7 miles north-eastward of Keith reef.

CAUTION.—As the currents are uncertain both in strength and direction, and the reefs not always seen, mariners should take great care to give all these dangers a wide berth. *See* Currents, page 54.

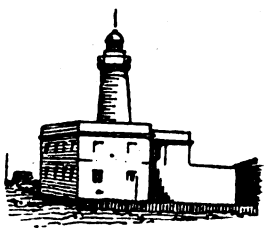
Chart 186, Mazzara to Palma, &c.

PANTELLARIA (ancient Cossyra). The north point of this island lies 109° true, distant 46 miles from Cap Bon, and 219° true, distant 56 miles from Capo Granitola, in Sicily. The island belonging to Italy, and administratively in the province of Trapani, is about 7 miles in length in a north-westerly and south-easterly direction, nearly 4½ miles in breadth, and composed of a mass of volcanic rock, with vestiges of craters, large quantities of lava, scoriæ, and pumice stone.

The hills are covered with brushwood, and the valleys are cultivated with olives, figs, vines, and vegetables. The land is high and broken, rising near the centre to a conspicuous peak 2,730 feet above the sea, and sloping to each end, the east being much the higher. On the southern side of the highest mountain is a wood of fine trees chiefly of chestnut and oak, and lower down are numerous olive trees.

On the summit of the mountain is a great natural curiosity, the remains of a crater, about 90 feet deep, converted into a deep lake, which is surrounded by a wall. The ridge of high land around the crater forms a complete amphitheatre, and commands a delightful view of the lake, the surrounding land, and sea.

LIGHT (*Lat. 36° 49′ N., Long. 12° 1′ E.*).—On Punta Spadillo, north-east coast of Pantellaria, a white circular tower, 69 feet in height, and surmounting a two-storeyed dwelling, exhibits, at an elevation of 164 feet above the sea, a *flashing white* light *every thirty seconds*, showing a *flash* for *eleven seconds*, followed by an eclipse of *nineteen seconds;* in clear weather it is visible from a distance of 19 miles. For arc of visibility, *see* Light list.



Punta Spadillo lighthouse.

Plan of Port Pantellaria on 186.

Il Porto, at the north-west end of the island, between Punta San Leonardo, which is low, and Punta della Croce, is a bay about a quarter of a mile wide and nearly the same deep, open to the north-west; the greater part is shallow and encumbered with rocks, several of which are above water and extend to the north-eastward for a

General charts 165, 2158a, b, 449.

Plan of Port Pantellaria on 186. Var. 8° 10′ W.

distance of 2 cables from the west side of the bay. Between the rocks and a cove on the eastern side of the bay is a clear space about a cable in extent, with 3 fathoms water.

A mole extends about 1½ cables from the west side of the bay and between its extremity and rocks extending three-quarters of a cable from the east side is the entrance, nearly half a cable in width, to another cove, nearly circular, less than a cable in diameter, with from 1½ to 2 fathoms water, where the country vessels are secured.

LIGHTS (*Lat. 36° 50′ N., Long. 11° 57′ E.*).—On Punta San Leonardo, from a red iron structure, above a hut with a white roof, 33 feet in height, is exhibited, at an elevation of 43 feet above the sea, an *occulting white* light *every ten seconds*, thus:—light, *seven and a half seconds;* eclipse, *two and a half seconds.* The light is visible in clear weather from a distance of 10 miles.

At the head of Il Porto a *fixed red* light is shown from a bracket on a wall, 16 feet in height, at an elevation of 16 feet above the level of the sea, and, in clear weather, is visible from a distance of 2 miles.

A *fixed green* light of small power is shown from the church of San Nicolo del Borgo, and is situated 1¼ cables south-westward of the preceding light. Too much reliance must not be placed on the two harbour lights.

Submarine telegraph cable.—Beacons.—A cable connects Pantellaria with Mazzara (south coast of Sicily). Its direction is marked by two beacons.

The beacons are posts, each surmounted by a white framework globe, one of the globes having the letter T on it, painted black. The rear beacon is attached to San Leonardo lighthouse; the front beacon is situated on a rock near the water. There is also a board, where the cable is landed, with notice that anchorage, &c., is prohibited near the cable.

Anchorage.—Large vessels will find temporary anchorage outside the bay in about 18 fathoms water, over sandy bottom, with the castle bearing 139° true, distant three-quarters of a mile; smaller vessels may anchor westward of Punta San Leonardo in 4½ fathoms water with good holding ground of sand, avoiding the telegraph cable.

Town.—The town of Pantellaria occupies the head of the bay, and in the middle of it is a conspicuous castle and prison. The population of the island in 1908 was 8,680.

The ruins of the ancient city of Cossyra are on the slope and in the valley south-east of the town, and there are some natural mineral baths of great antiquity.

General charts 186, 165, 2158a, b, 449.

Plan of Port Pantellaria on 186. Var. 8° 10′ W.

Communication.—Weekly steamers alternately to Trapani and Porto Empedocle, and frequent communication with Tunis, but the vessels do not communicate in bad weather. Telegraphic communication: The telegraph office is open till 9 p.m.

Supplies.—Moderate supplies of fresh provisions and water may be obtained.

Lloyd's signal station.—A Lloyd's signal station and semaphore is established at Monte Sant' Elmo, south-eastward of the town.

Trade.—Vines are grown extensively, and the production of wine and dried currants is not unimportant; there is also a small export trade of oil, cotton, and orchitt for dyeing, and the island is famous for a hardy race of donkey, supposed to be of African origin, but developed into a species.

Pratique.—Vessels on arriving have to obtain pratique; the health office is on the north side of the harbour; the town landing place is at a small pier, westward of the castle.

Chart 186, Mazzara to Palma, &c.

Coasts.—The north-east coast of the island is irregular and rocky, and between Kharuscia point and Punta Spadillo is a bay, about 1½ miles in width, in which is Khartibugal shoal, of 5½ fathoms, situated half a mile off-shore, and surrounded by deep water. Within the head of the bay is a lake about a mile in circumference, and near it are various warm springs.

About 2 miles south-eastward of Punta Spadillo are Cala di Tramontana and Cala di Levante, separated by Punta Tracino, off which is a high, rocky islet with deep water between. From Cala di Levante the coast to the southward and south-westward (for 4½ miles to the south extreme of the island, near Punta Limarsi) is composed of nearly inaccessible cliffs, at the foot of which are some rocks above and below water.

On the south-west of the island, a little south of Punta del Rosso di Nica, and a quarter of a mile off a fall of black lava, is Secca di Nica, on which the depth is 4 fathoms, and a small inlet, named Porto di Scauri (*Lat. 36° 46′ N., Long. 11° 58′ E.*), open to the south-eastward, is situated inside Punta Tre Pietre, 1½ miles further north-west, from which a broken and rocky coast continues to Cala Brabant, 2½ miles north-westward, and then turns to the northward to Punta della Croce, the west point of Rada di Pantellaria.

All this part of the coast is rugged, with steep, inaccessible cliffs, having basaltic caves at the base, and some rocks are scattered along shore, but none at a considerable distance.

General charts 165, 2158a, b, 449.

Chart 186, Mazzara to Palma, &c. Var. 8° 10′ W.

Depths off-shore.—The 100-fathom contour line generally surrounds Pantellaria at distances of from three-quarters of a mile to a mile, except on the north-east side, where, at Punta Spadillo, it is only about a quarter of a mile off-shore, and at the north-west end, where its distance is $2\frac{3}{4}$ miles.

There are races off the several headlands, and the current is said at times to run strong from the westward towards the island. It lies directly in the track of vessels proceeding to Malta from Cap Bon; therefore at night, or in thick weather, a good look-out is necessary.

Scourge patches and **Pantellaria patch** lie between the bearings of 18° and 31° true, distant from 22 to 25 miles from Punta San Leonardo, Pantellaria; Pantellaria patch, the eastern, has a depth of 5 fathoms near its western extreme.

About $3\frac{1}{2}$ miles westward of it the larger patch extends about 2 miles east and west, and $1\frac{1}{2}$ miles north and south, and has from 7 to 14 fathoms water over it.

With the exception of Smyth patch, of 20 fathoms, about 7 miles westward of the preceding, the surrounding depths to that distance are from 40 to 45 fathoms over sand, shells, and gravel.

Vessels of deep draught should avoid these patches, especially with any sea, by keeping within the distance of 20 miles from Pantellaria, whilst the peak of that island bears between 188° true and 203° true.

Chart 250, Fratelli rocks to Mahedia.

Talbot shoal (*Lat. 37° 28′ N., Long. 11° 39′ E.*), about 30 miles to the north-westward of Scourge patches, is about three-quarters of a mile in diameter. A little to the westward there is a depth of 200 fathoms; but to the eastward, adjacent to Adventure bank, uneven ground of from 13 to 50 fathoms. The shallowest part, 8 fathoms, bears 338° true, distant 46 miles from the peak of Pantellaria.

Chart 186, Mazzara to Palma, &c.

GRAHAM SHOAL, which is the remains of the volcanic island of the same name, had in 1863 the least water on it of 15 feet, from which San Calogero monastery north-eastward of the town of Sciacca in Sicily bears 42° true, distant 28 miles. (*See* view on chart.) Capo Granitola lighthouse lies 25 miles to the northward, but the range of the light will not allow it to be seen from any part of this shoal.

In an examination made by the officers of H.M. surveying vessel *Shearwater* in the year 1870, a depth of 3 fathoms was found in this position. In the year 1885 not less than 4 fathoms could be found by H.M. surveying vessel *Sylvia*. The minimum depth, $2\frac{1}{2}$ fathoms, has, however, been retained upon the charts.

General charts 165, 1440, 2158a, b, 449.

Chart 186, Mazzara to Palma, &c. Var. 8° W.

The shoal has two heads close together, and at a distance of about 20 yards all round, there are from 7 to 9 fathoms water. The bottom is cinders and fine black sand, occasionally coral and brown sand. At about half a mile from the least water is a patch with 19 and 20 fathoms on it.

The shoal lies on the western edge of a bank which extends about 12 miles east and west, and 9 miles north and south, having on it several patches, the depths varying from 18 to 90 fathoms. At 2 miles westward of the shoal there are depths of more than 150 fathoms.

Respecting this interesting phenomenon, Commander Swinburne, of H.M. sloop, *Rapid*, states that on the 28th of June, 1831, when passing nearly over the spot, several shocks of an earthquake were felt, proving that volcanic action was in operation. On the 19th of July, after an eruption of a high column of water and smoke, a tract of land with a crater mouth rose a few feet above the level of the sea, and was in great activity, emitting vast volumes of steam, ashes, and scoriæ. From that time it gradually increased in dimensions, magnificent eruptions of cinders with white vapours rising to the height of from 400 to 1,000 feet, accompanied by a noise like thunder; at night constant shootings of small columns of fire were visible, with occasional flashes of sheet lightning. Towards the end of August, its circumference was about 1,080 yards, and its height stated to be from 107 to 180 feet; then various changes took place, it gradually subsided, and in December had disappeared; in January, 1832, there were from 2½ to 3 feet of water over the spot.

Current. — The current in the vicinity of the shoal is irregular both in strength and direction, generally, however, setting to the south-east, and at times as much as 3 knots an hour to the north-east.

Terrible bank is the name given to the eastern part of the before-mentioned bank, its shoalest spot of 18 fathoms lies 7 miles eastward of the Graham shoal.

Chart 194, Malta and Gozo islands.

THE MALTESE ISLANDS. — GOZO (*Lat. 36° 4′ N., Long. 14° 13′ E.*) (ancient Ganlus), named Ghaudesh by the natives, the second in importance of the Maltese islands, is 8 miles in length, in a west-north-west and east-south-east direction, and 4 miles in breadth, containing an area of 20 square miles, and a coastline of 25 miles. It is separated from Malta by a channel 2½ miles wide, in the middle of which is Comino island.

Gozo is entirely surrounded by perpendicular cliffs, those to the south and west attaining a great elevation. The principal town is

General charts 3670, 165, 2158a, b, 449.

Chart 194, Malta and Gozo islands. Var. 7° 30′ W.

Rabat, near the centre of the island, and there are also several villages and scattered houses; the whole island is well cultivated. The small bay of Mjiar on the south-east coast is defended by Fort Chambray; there are besides several towers and redoubts round the island. There is a coral fishery on the western and southern side of the island.

North coast.—Cape San Dimitri, the north-west extreme of the island, is high, bold, and steep-to, the 50-fathom contour line passing within 2 cables of the cliffs. At 2 miles eastward of the cape is Ras Pinu, the intermediate coast being high and steep and about half a mile inland, Guirdan, is a remarkable hill 528 feet above the sea.

LIGHT (*Lat. 36° 4′ N., Long. 14° 13′ E.*). — On the highest part of Guirdan hill, at half a mile from the coast, is a white tower, 71 feet in height, surmounting a dwelling; it exhibits, at an elevation of 595 feet above the sea, a *revolving white* light *every minute*, which is visible in clear weather from a distance of 24 miles.

Signal station. — There is a signal station on Guirdan hill, the flagstaff being close to the northward of the lighthouse.

Coast. — About 1⅓ miles eastward of Ras Pinu, the little promontory named Gholya Baida, faced with low cliffs, juts out from the coast, forming a small bay on each side of it, and has a remarkable steep, white mound 85 feet high, and shaped like a truncated cone standing on it; a small redoubt stands eastward of the mound, and midway between the two points shallow water extends off nearly 1½ cables, and a rocky shoal, with from 2 to 3 fathoms water over it, extends northward and eastward of Gholya Baida.

Marsa Forno, half a mile east of Gholya Baida, is an inlet about a quarter of a mile deep and 1½ cables wide, with depths of from 3 to 4 fathoms in the middle and a beach at its head; the east side of the inlet is fringed by a reef which is awash. The village of Marsa Forno stands at the head of the inlet and a small church with a spire in the south-east corner. There is also a small camber for boats, protected by two arms of a breakwater, and having 6 feet of water in it. *See* view facing page.

Close westward of Marsa Forno is Gholya-is Safra a remarkable isolated, steep, conical, yellow hill, 206 feet above the sea, and half a mile south of this another remarkable hill, named Gholya Merzuch, is 322 feet above the sea.

From Marsa Forno as far eastward as il Jebla tal Mistra, a distance of 2½ miles, the general appearance of the coast is that of a flat tableland bordered by precipitous reddish cliffs, from 250 to 350 feet above the sea, which break down in steep slopes of large boulders to the shore.

The line of cliffs is intersected by Wied-il-Ghanak and Wied-la-San Mas, the two main cultivated valleys, and the steep slopes, at the

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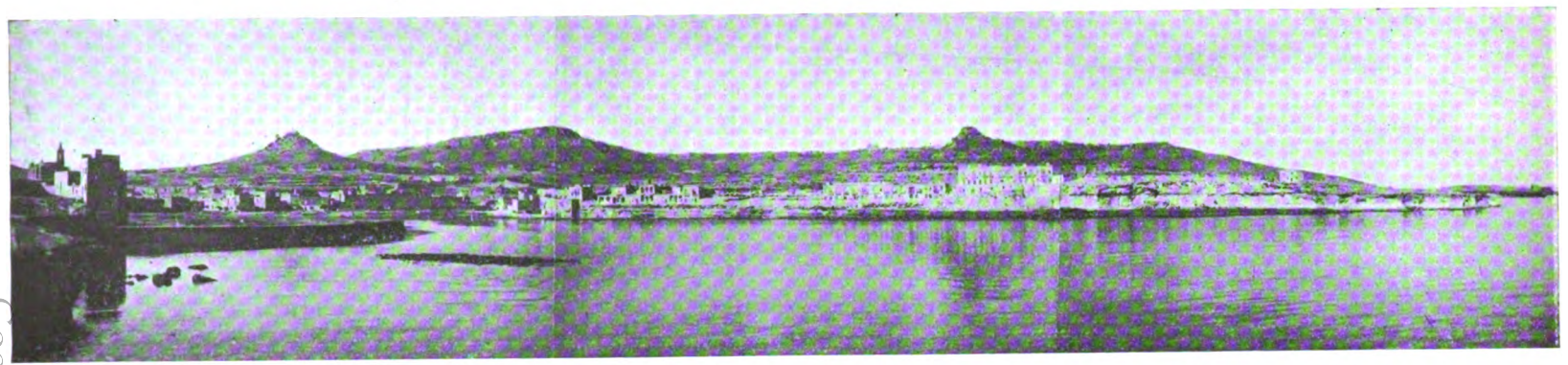

Marsa Forno.

Chart 194, Malta and Gozo islands. Var. 7° 30′ W.

base of the cliffs and between the large boulders, are cultivated with vines, the villages of Shara and Nadur, with their churches and several windmills, are seen on the tableland towards the interior of the island.

On the first cliff east of Marsa Forno is Torri ta Shara, a square redoubt with a tower, 45 feet in height and standing 370 feet above the sea.

Ramla el Kibifa, 1¼ miles eastward of Marsa Forno, has a conspicuous sandy beach with a white statue in the centre of it; the bay is shallow and rocky but affords temporary anchorage to small vessels in fine weather, care being taken to avoid patches of rock which show distinctly from the white sand which forms the general bottom of the bay.

A rock, with less than 6 feet water over it, lies about a cable from the shore with Torri ta Shara, bearing 280° true, distant 5½ cables.

A bank, 2½ cables in length in an east and west direction and one cable in breadth, with from 9 to 10 fathoms water over it, lies eastward, distant 5½ cables from Ir Rajel, the eastern point of Ramla el Kibifa; there are depths of from 11 to 15 fathoms between this bank and the shore.

Plan 2623, Comino channels.

San Blas bay (*Lat. 36° 3′ N., Long. 14° 18′ E.*), the next bay east of Ramla el Kibifa has two rocky patches, with 2 fathoms least water over them, lying about 1½ cables from the nearest point of the shore on the western side of the bay.

Il Jebla tal Mistra, 2½ miles east of Marsa Forno, is a bold point formed of large boulders that have fallen from the cliffs above; Torri ta Isopu, a square tower, 44 feet in height, stands near the edge of the cliff immediately above the point. To the eastward of il Jebla tal Mistra the coast becomes less precipitous to Ras il Kala, 2 miles distant; a third of a mile westward of Ras il Kala are some stone quarries.

Ras il Kala, the east extreme of Gozo, is clear of outlying dangers. About a third of a mile south-west of it is a rocky islet, named Jebel tal Halfa, 72 feet high, from which a chain of rocks extends westward, parallel to the shore, for about the same distance; thence the coast is clear of danger to Mjiar bay.

The channel between Gozo and Comino, named Il Fliegu ta Ghaudesh (North channel), is about half a mile wide.

Anchorage.—Temporary anchorage will be found off Mjiar, about 2 cables from the shore, in 10 fathoms water, over sand, with the church seen up the main street of the town, bearing about 291° true, and the outer rock off Chambray in line with the low point

Plan 2623, Comino channel. Var. 7° 30′ W.

beyond, 238° true; but it is exposed to the easterly winds which blow through Comino channel, and westerly and southerly winds. In approaching the bay from the eastward, keep in mid-channel, between Gozo and Comino.

Landing. — There is landing by boat at Chambray, just inside a small breakwater made of rough stones, where the Gozo steamers load and discharge their cargoes.

Water may be obtained here.

South and West coasts.—Nearly 1½ miles westward of Mjiar bay is a small islet, 33 feet high, named Tal Fessei, fronting Mjiar ish Shini, an inlet a quarter of a mile deep, with a well and tower at its entrance, and having 12 fathoms water at the mouth to 2 fathoms at its head.

Chart 194, Malta and Gozo islands.

The coast to Ras el Newhela, three-quarters of a mile beyond the inlet, is bold, with deep water close-to, whence it trends west-north-west; the steep white cliffs, having various caves or grottoes at their base, rise to about 160 feet above the sea. The 50-fathom contour line passes about a quarter of a mile from the coast.

Ras il Baydha, 2¾ miles further on in the same direction, has a tower on it, and is surrounded by rocks which afford some shelter to Cala tas Sclendi, an inlet on its north side, which is about 2 cables deep, with from 2 to 3½ fathoms water. There is a rock with 4 feet over it, and 4 to 6 fathoms around, lying in the middle of the entrance to Cala tas Sclendi; it is situated three-quarters of a cable northward of the tower on Ras il Baydha. Cape Bombardo, 1¼ miles to the north-westward of Ras il Baydha, is a high, bold, perpendicular headland, steep-to, with a tower on it.

From Cape Bombardo the west coast of Gozo trends northward for 2½ miles to Cape San Dimitri, and though high and bold is of less elevation than the south coast. About 6½ cables northward of Cape Bombardo is a small islet, named Ta General or Fungas rock; it fronts the Cala Dueira, a circular basin, about 2 cables in diameter, with from 5 to 7 fathoms water in it; on the north side is a tower.

The shore, for nearly half a mile northward of Ta General, is bordered by shoal water which extends off nearly 2 cables, and is steep-to. Coral fishing is carried on along the coast.

Plan 2623, Comino channels.

COMINO (*Lat. 36° 0′ N., Long. 14° 20′ E.*), the third of the Maltese islands, is about 1½ miles in length in a west-north-west and east-south-east direction, and a mile in breadth, with a coastline of 6½ miles with irregular cliffy shores, skirted here and there by rocks. The island is mostly cultivated, has a farm, chapel, and wells upon it; a tower, named Torri ta Kemmuna, stands on its south-west end;

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Plan 2623, Comino channel. Var. 7° 30′ W.

adjacent on its west side is the islet of Comminotto with several rocks; these islets are bare and rocky. Comino and Comminotto are named respectively Kemmuna and Kemmunet by the Maltese. *See* also Quarantine regulations, page 504.

Coasts.—The eastern side of Comino is entirely composed of high cliffs, rising in many places to nearly 140 feet above the sea, with many caves and scattered rocks at their base. Skol tal Prosha, the eastern point, has a cliff 184 feet high, and it is foul for the distance of a quarter of a mile from the cliffs.

The south-west point of Comino, named Irkieka ta Kemmuna, is low and sharp, and can be rounded at the distance of a cable, as there are no off-lying rocks.

On the north side of Comino are several small bays only suitable for boats, and the north-east point named Ras tal Imnieri should be rounded with caution, as foul ground lies off it, and it should not be approached within a distance of 2 cables.

Sultan rock (Skoli tal Abiat tal Prosha) (*Lat. 36° 0′ N., Long. 14° 21′ E.*), with a depth of 3½ fathoms, and on which H.M.S. *Sultan* struck and sank in the year 1889, lies with the rocky islet off Skol tal Prosha bearing 333° true, distant 1$\frac{8}{10}$ cables. Another rocky patch on which the depth is 3 fathoms lies about 150 yards south-westward of Sultan rock, and a rock, with 4 fathoms, midway between this latter rock and Comino island. There is a depth of 5½ and 6½ fathoms between the patches.

Clearing mark.—Palazz iz Zgheir in line with the fall of the cliff of Rdum il Kaui, behind Ich Chirkeuua, bearing 227° true, leads about 3 cables south-east of these dangers. *See* view on plan.

Anchorage.—It is not desirable for vessels to anchor off the south shore of Comino as the sandy patches are few, and too near the rocks, but on the western side, there is anchorage in Il Mats, a bay between Irkieka ta Kemmuna and Comminotto. The north-west point of Comminotto is foul, and in rounding it keep the Palazz tal Marfa open of Irkieka ta Kemmuna, bearing 139° true. If anchoring in either of the Comino channels, care should be taken to avoid the telegraph cables.

Comino channels are formed on either side of the island of Comino, and have deep water; but submerged ledges, on which the bottom is rocky and uneven, extend from either side. The north channel varies in width from 4 to 6 cables, and has in midway depths varying from 11 to 20 fathoms. The south channel, named Il Fliegu ta Malta, has an average width of a mile, with depths of 12 to 25 fathoms. It is recommended to keep in mid-channel.

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Plan 2623, Comino channel. Var. 7° 30′ W.

Currents. — The currents are irregular in direction, sometimes setting against a strong wind; but their strength is usually less than a knot an hour.

Chart 194, Malta and Gozo islands.

MALTA (ancient Melita) (*Lat.35°53′N.,Long.14°31′E.*) is about 15 miles in length, in a north-westerly and south-easterly direction, and rather more than 7 miles in breadth, with an area of 95 square miles, and a coastline of 79 miles, much of which, on the western and southern coasts consists of perpendicular cliffs with steep slope behind rising, near the south-western coast, to a height of 845 feet above the sea; the remaining coasts are broken into numerous creeks and bays, the most important being the harbours of Valletta.

The island is of an irregular oval shape, tapering to the north-westward, and rising near the western side at Nadur tower, 785 feet above the sea; its outline presents the appearance of an inclined plane, sloping gradually from the Bengemma hills to the more level land on the north-east and south-east.

The surface of the island is covered with hills of moderate height with steep slopes, which are terraced and cultivated wherever possible; it has neither lake nor river, and comparatively few springs, the water supply being chiefly derived from tanks with which nearly every house is provided.

Malta contains three cities and many villages; the old capital of Medina Notabile, or Citta Vecchia, with its cathedral situated on the rising ground to the west; Valletta, the present capital, and port; and Sliema. The civil population of the islands in April, 1911, was 211,473.

Submarine vessels.—CAUTION.—*See* page 26.

Signal to indicate presence.—Letter S flag, naval code (a blue triangular flag with a yellow fly), will be hoisted at the Castille, Palace tower, and Custom-house, to indicate that submarine vessels are under way in the harbour, or within a mile of the entrance. This signal does not prohibit the entry or departure of merchant vessels, but is intended to serve as a warning of the presence of submarine vessels.

The Castille will hoist the flag when submarine vessels are observed to be under way within the limits named, and at the same time will request Palace tower and Custom-house to do likewise.

The signal will be hauled down at the Castille when the submarine vessels are beyond the mile limit or are secured in harbour.

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Chart 194, Malta and Gozo islands. Var. 7° 20′ W.

Artillery practice.—Regulations.—The following regulations govern the artillery practice from any fort on the islands of Malta and Gozo:—

A blue pennant over a red flag will be displayed at the work from which practice is to take place on the afternoon previous to such practice, and at 7 a.m. on the day on which the practice takes place. The same signal will be displayed from the launch leaving the harbour with targets, whenever artillery practice is to take place from any of the defence works in the undermentioned areas. A red flag will also be hoisted fifteen minutes before the commencement of, and kept flying during the continuance of, firing from the work from which practice is to be made.

Limits of fire zone areas:—

a. Between a line drawn 312° true from Fort Madalena and a line drawn 16° true from Madalena tower.

b. Between a line drawn 16° true from Madalena tower and a line drawn 43° true from Spinola, north point of entrance to St. Julian's bay.

c. Between a line drawn 43° true from Spinola and a line drawn 43° true from Fort St. Elmo.

d. Between a line drawn 43° true from Fort St. Elmo and a line drawn 42° true from a point on the coast situated $1\frac{1}{10}$ miles 110° true from Fort Ricasoli.

e. Between a line drawn 42° true from the above-mentioned point (*d*) and a line drawn 98° true from a point on the coast situated 8 cables 324° true from the old tower on north point of entrance to Marsa Scala.

f. Between a line drawn 98° true from the above-mentioned point (*e*) and a line drawn 135° true from Wolseley battery, which is situated at a distance of $5\frac{1}{2}$ cables 34° true from Dellimara point light.

g. Between a line drawn 135° true from Wolseley battery and a line drawn 178° true from a point on the coast situated at a distance of $6\frac{1}{2}$ cables 245° true from Binghaisa point.

h. Between two lines drawn 282° true and 328° true, respectively, from Bengemma fort on the western side of the island.

The danger limit extends to 14,000 yards from the firing point.

Whenever and so long as a red flag is hoisted at any fort on the shore, between the lines described above, denoting the danger area, fishing is prohibited, and vessels are forbidden to pass through that area unless compelled to do so by stress of weather, in which case the master of the vessel may be called upon to prove that entering the area was unavoidable.

Any person infringing the above regulations will be liable to be

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Chart 194, Malta and Gozo islands. Var. 7° 20′ W.

proceeded against, and will be subject to a fine not exceeding £5 or to a period of detention not exceeding one month, or both punishments simultaneously, and the vessel may be towed out of the prohibited area by Government launches stationed in the vicinity for the purpose.

Searchlights. — Searchlights are worked every Tuesday, and possibly on other nights also, throughout the year, in the harbours of Malta.

Any vessels approaching the harbours of Malta when searchlights are being worked, and finding that they interfere with her safe navigation, may make use of the following signals, either singly or combined: —

(*a*) By flashing lamp, *four short* flashes followed by *one long* flash.

(*b*) By whistle, siren, or fog-horn, *four short* blasts followed by *one long* blast.

Whenever possible, both flashing lamp signals and sound signals should be used.

On these signals being made, the searchlights will be worked so as to cause the least inconvenience, being either doused, raised, or their direction altered.

The signals should not be used without real necessity, as unless the vessel is actually in the rays of the searchlight it is impossible to know which searchlight is affected.

Note.—These signals are designed to assist mariners, and do not render the Government liable in any way.

Plans 2063 and 2623.

NORTH COAST. — From Ponta tal Marfa, the north-west extreme of the island, the coast, which is low and rocky, trends to the eastward for a distance of 2 miles to Ponta tal Ahrash, and is broken into several small bays, with beaches; the remains of old batteries stand at the heads of, and on the points between, the bays.

Close to Ponta tal Marfa stands an isolated building, named Palazz iz Zgheir, which is an old rest-house, and further to the eastward a larger building, of a pink colour, with a castellated appearance, is situated just above the coast; it is named Palazz tal Marfa, and is now used as a police station. On the high ridge is another pink castle, named Torri l' Ahmar, which is very conspicuous.

Anchorage may be obtained off this shore, with good shelter from southerly winds; the water is very clear, and the bottom, composed of sand and weed, easily visible in 12 fathoms. In anchoring a sandy spot should be looked for, as there are a few rocky patches; but the chart will be a sufficient guide for their avoidance.

Ponta tal Ahrash (*Lat. 36° 0′ N., Long. 14° 22′ E.*) is low, and a spit, with 4½ fathoms water over it, extends for a considerable dis-

Plans 2063 and 2623. Var. 7° 30′ W.

tance north-westward from it. Palazz tal Marfa, in line with the fall of the high cliff at Ras il Kammieh, bearing 229° true, leads to the northward of this spit in 10 fathoms of water (*see* view on plan 2623). There is a conspicuous building, 17 feet in height, near Ponta tal Ahrash, named Torri l'Abiat.

Coast.—From Ponta tal Ahrash the coast turns to the south-eastward for three-quarters of a mile to Dahlet ish Shillip, a high bluff, which forms the north point of the fine bay of Mellieha; the point is marked by a conspicuous chapel and a statue close to the edge of the cliff. Between Ponta tal Ahrash and Dahlet ish Shillip the coast is composed of high broken cliffs, with rocks below, in places, and especially near the latter point.

Deep water is found within a short distance from the shore, and a good mark for passing along this coast is the western of two windmills, on the Nadur ridge of Gozo, in line with the perforated cliff on the eastern side of Comino; but frequently the haze, during the summer months, prevents such distant marks from being seen.

Plan 2063, Malta island, northern portion.

Secca il Baida (Balls bank) (*Lat. 36°0′N., Long. 14°25′E.*), a shoal of irregular outline, $1\frac{3}{4}$ miles in length in an east-south-east and west-north-west direction, is situated about one mile to the eastward of Ponta tal Ahrash. The general depths over it are from 8 to 10 fathoms, but there are shoal spots of 6 fathoms, and it is not advisable for vessels of heavy draught to cross it. Around are several detached patches, but none are dangerous. Target buoys for artillery practice are sometimes laid out on this bank, *see* page 493.

Clearing marks.—Irkieka ta Kemmuna open of Ponta tal Ahrash, bearing 278° true, lead to the southward of Secca il Baida, and Ponta tal Marfa, in line with Ponta tal Ahrash, bearing 251° true, leads to the northward. Musta dome, in line with Torri Kaura beacon bearing 178° true, leads to the eastward.

Mellieha bay is $1\frac{1}{2}$ miles deep, with good anchorage and shelter from northerly and westerly winds for all classes of vessels; the head of the bay is foul, and vessels of deep draught are recommended to keep outside the line on which the rock off Ras il Griebeg is seen under the statue of St. Paul on Gzeier, bearing about 111° true. On the southern side, between Ras il Griebeg and Blata il Baida the coast should not be closed nearer than the 10-fathom line, as several sunken rocks lie off it surrounded by 7 fathoms water.

The town of Mellieha is built on one of the slopes on the southern side of the bay, near its head, and its church is conspicuous.

Tunny fishery.—Tunny nets extend, during the season, half a mile in a southerly direction from Dahlet ish Shillip. For Lights, marks, and caution, *see* page 73.

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Plan 2063, Malta island, northern portion. Var. 7° 30′ W.

Gzeier (the islands), the islet which lies off the Selmun peninsula, between Mellieha and St. Paul's bays, has on its western end a large statue of St. Paul the Apostle, which forms a conspicuous and useful landmark. Between Gzeier and the main island there is a narrow rocky channel, only passable for boats, and off the eastern end of Gzeier a spit extends, for the distance of 1¼ cables; Torri il Ghallis (white), open to the northward of Torri Kaura (pink), bearing about 131° true, leads to the northward of this spit.

On Selmun peninsula, which rises immediately behind the town of Mellieha to 500 feet above the sea, stands the Palazz Selmun, once a summer residence of the Grand Masters and still kept in repair.

ST. PAUL'S BAY (*Lat. 35° 58′ N., Long. 14° 25′ E.*) is well sheltered from all winds except those from N.E. by N. to East, the holding ground is good, and, with the exception of a rocky patch near the entrance, vessels can anchor all over it outside the 10-fathom line; within this limit a sandy spot should be looked for. A rocky shoal, with 4 fathoms water over it, lies near the head of the bay about 3 cables north-westward of Skol tal Ghazzonin.

St. Paul's shoal, with a least depth of 6½ fathoms, rock, lies nearly in the middle of the bay about 4 cables south-eastward from St. Paul's statue.

Small vessels will find a good sheltered anchorage between the 4-fathom rocky shoal and Kala Mistra, a little bay on the north side, with the extreme of Ponta il Mijnuna in line with St. Paul's statue, bearing 22° true, and Uardia tower in line with Nasciar dome, 137° true; Kala Mistra is foul inside and the head of St. Paul's bay only suitable for boats.

On the southern side of the bay is the village of San Paul a Mare, a favourite seaside resort during the summer; Uardia tower, large, square, and white, is conspicuous in the front. Immediately behind the village, the hills slope rapidly from 350 feet above the sea, while to the eastward, along the coast, the ground declines to a low point, named Ras il Kaura, off which a spit extends to the eastward for a distance of 5 cables to the 10-fathoms line. Torri San Marcu (pink) under, and in a line with, the left extreme of Fort Madalena, bearing 154° true, leads to the eastward of this spit.

Jetty.—On the south side, and near the head of St. Paul's bay, there is a small stone jetty 30 yards in length with a depth of 2 fathoms close alongside on either side, but at the head it extends under water for about 15 feet, having a depth of 3 feet on it.

Light.—At the root of the jetty, from an iron lamp-post, is exhibited an unwatched *fixed white* light, which is visible in clear weather from a distance of 2 miles.

General charts 194, 3670, 165, 2158a, b, 449.

Plan 2063, Malta island, northern portion. Var. 7° 30′ W.

Examination anchorage.—An area for the examination of vessels, under the circumstances described inside the cover of this book, has been appropriated in St. Paul's bay.

Vessels inconvenienced by searchlights. — For signals to be made *see* page 494.

Communication. — Torri Kaura, 42 feet in height, and 2½ cables westward of Ras il Kaura, is a pink watchtower, marked by a pole surmounted by a diamond, also by a vertical black stripe (partially obliterated) on its north and east fronts; the top of the tower is 87 feet, and of the beacon, 106 feet above high water; it is in telegraphic communication with Valletta.

Coast. — Between Ras il Kaura and Madalena point the coast is low and irregular, forming several small bays, which are too confined and foul to be used as anchorages; they will, however, be found useful for boats, and landing is generally practicable. The principal features are Salina bay or Benuarrat, at the head of which are the Government saltworks; Ras il Ghallis, having Torri il Ghallis, white, and 39 feet high, on it, and off which there is a low islet, Il Gzeira tal Ghallis; Kalet San Marcu, with Torri San Marcu, pink, and 38 feet high, on Ras il Kreiten, from which eastward distant 4 cables there is Marcu shoal, with 4 fathoms water over it; and Bahar ich Chaghak and Madalena point, 4 cables westward of which latter stands Torri Madalena, white and 40 feet high.

Signal station (*Lat. 35° 56′ N., Long. 14° 27′ E.*).—At Jebel San Pietru, $1\frac{1}{10}$ miles southward of Torri San Marcu, there is a signal station, 477 feet above the sea. It is locally known as Gargur.

Wireless telegraph. — A mast for wireless telegraph, belonging to the Eastern Telegraph Company, is situated 4¼ cables south-south-westward from St. Georges tower.

Rifle range.—Buoys.—Three red conical buoys, surmounted by a staff and cage, are moored to the northward of Madalena point to mark the limit of the dangerous zone from the rifle fire from the ranges between Madalena and St. Georges. They are about 7 cables apart, and lie about $1\frac{3}{10}$ miles from the coast.

A red flag will be hoisted at Torri Madalena and St. Georges tower as a warning that rifle practice is going on, and vessels should pass to the northward of the buoys.

St. Georges shoals. — From St. Georges bay, 2 miles to the north-west of St. Elmo light-tower, a rocky bank extends nearly three-quarters of a mile from the shore, with three shallow patches on it, named, respectively, Outer, Middle, and Inner St. George rocks.

The outer shoal has 5 fathoms water over it, and lies 37° true distant 5½ cables from the tower on St. Georges point.

The inner shoal, with a depth of 3 fathoms over it, is 74° true, distant 3 cables from St. Georges tower.

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Plan 2063, Malta island, northern portion. Var. 7° 30′ W.

The middle shoal with 4¼ fathoms water is nearly midway between the other two.

Clearing marks.—St. Paul's church spire in line with the east steeple of St. John's church, bearing 167° true, leads to the eastward of the shoals, and Torri San Marcu in line with Palazz Selmun, 282° true, leads to the northward in 8 fathoms water. These clearing marks lead inside rifle range buoys. *See* views A and B on chart 194.

With the above exceptions the north-east coast of the island is clear of out-lying dangers, and if necessary may be approached to a distance of half a mile; but in standing towards the shore, a sailing vessel should tack on the first shoal cast of the lead.

Chart 194 and plan 2063.

Directions. — Vessels from the westward often experience a set to the southward, and in sighting the land, Gozo is observed on the port, instead of the starboard, bow; therefore, in approaching these islands, especially with the wind from the north-westward, a sailing vessel should steer rather to the northward of them. If bound to Valletta, run along the north side of Gozo, at any convenient distance according to the wind and sea, as it is bold and clear of off-lying danger.

During bad weather and a heavy sea, Guirdan lighthouse (Gozo) should be kept open and not brought to bear more than 290° true to avoid the north part of Secca il Baida or Balls bank (which is said to break in bad weather); but with smooth water a vessel of moderate draught may pass over it.

When past Secca il Baida a course may be steered to pass at a distance of 1½ or 2 miles along the north coast, and when St. Paul's church is in line with the east steeple of St. John's church, bearing 167° true, St. Elmo may be steered for. *See* directions for entering Valletta harbour at page 501, and directions from Malta to the westward, page 517.

Plan 974, Valletta harbours.

HARBOURS.—Marsa Musciet, known as Quarantine harbour, situated on the north-west side of Valletta, extends upwards of 1½ miles, and terminates in two creeks, separated by Pieta point; the harbour, though narrow, is deep, having from 5 to 18 fathoms water, except near the shore and at the head of the creeks.

The entrance between the shore of St. Elmo and Tigne point is about 2 cables wide, and within, on the north-west side, the harbour is divided into Sliema and Lazaretto creeks by Jezirah island, which lies nearly in the centre, and on which is Fort Manoel and the Lazaretto. The island is connected to the shore by a bridge, and narrows the harbour to less than 1½ cables.

LIGHTS (*Lat. 35° 54′ N., Long. 14° 31′ E.*).—At Fort St. Elmo a white tower, 59 feet in height, exhibits, at an elevation of 167 feet

Plan 974, Valletta harbours. Var. 7° 20′ W.

above the sea, a *fixed white* light, which is visible in clear weather from a distance of 15 miles.

On Tigne point, at the north side of entrance to Marsa Musciet, a square stone tower exhibits *two fixed white* lights placed vertically. They are elevated 65 and 80 feet, respectively, above the sea, and are visible in clear weather from a distance of 4 miles. For arc of visibility, *see* Light list.

A *fixed white* light is exhibited from an iron staff on Fort Manoel, 38 yards within the eastern extremity of Jezirah island, at an elevation of 21 feet above the sea, and, in clear weather, it is visible from a distance of 2 miles. For arc of visibility, *see* Light list.

Dragut point.—Buoy.—A red spar buoy is situated 150 yards eastward of Dragut point.

Submarine mines.—When submarine mining practice is taking place, northward of Dragut point, the area is marked by green buoys.

Dragut shoal, having a depth of 5 fathoms over it, lies 3½ cables north-eastward from Fort Tigne lighthouse. *See* page 501 for clearing marks.

Ferry.—A steam ferry runs from St. Paul steps to the north side of Sliema creek.

Buoy. — A red spar buoy marks the extreme of shoal water off Public baths.

Mooring buoys, the positions of which are marked upon Admiralty charts, are placed in Sliema and Lazaretto creeks.

Sliema creek. — Petrol regulations. — Whenever one of H.M. auxiliary vessels, or submarines, is discharging or taking in petrol at the store, Fort Manoel (Old Torpedo pier), in Sliema creek, a red flag will be hoisted at the end of the pier. Two mooring buoys for berthing petrol-carrying vessels lie off the pier.

Whilst the flag is flying, all vessels are to keep outside a radius of 250 feet, and steam vessels going up or down Sliema creek should always pass on the north (Sliema side) of Nos. 1 and 2 large mooring buoys in the middle of the harbour.

For the convenience of the local ferry service only, two red buoys will be dropped marking the exact radius they should keep outside these buoys.

GRAND HARBOUR (*Lat. 35° 53′ N., Long. 14° 31′ E.*).—The Grand harbour of Valletta, entered between the breakwaters extending from St. Elmo and Ricasoli points, a distance of about 2 cables, is commodious and safe; it extends to the south-west along the south shore of Valletta and Floriana for above 1¾ miles. Within the entrance, on the south-east side of the

General charts 2628, 194, 3670, 165, 2158a, b, 449.

Plan 974, Valletta harbours. Var. 7° 20′ W.

harbour, is Bighi bay, with Calcara creek at its head, and farther in, Dockyard and French creeks, which each extend about 6 cables. The extremity of the peninsulas forming these creeks, extend to within less than 2 cables of the shore of Valletta, thus reducing the breadth of the harbour.

Within the harbour the water, everywhere sufficiently deep for the largest vessels except at the Marsa or head of the harbour, ranges from 14 to 5 fathoms, as far up as Gun wharf point, thence from 4½ to 3 fathoms to the head of the harbour.

Breakwaters. — From St. Elmo point a breakwater extends in an easterly direction, with a curve to the south-eastward at its eastern end, for a distance of 500 yards; the 10-fathoms contour line extends parallel with that breakwater at a distance of one cable from it on the northern side, and at half a cable from the southern side.

From Ricasoli point a breakwater extends in a north-westerly direction for a distance of 120 yards.

LIGHTS (*Lat. 35° 54′ N., Long. 14° 31′ E.*).—From a white circular tower, with a red horizontal stripe on the eastern side, on the outer end of St. Elmo breakwater, is exhibited, at an elevation of 60 feet above the sea, a *flashing white* light *every five seconds*, visible in clear weather from a distance of 12 miles.

From a white cylindrical stone tower, 30 feet in height, with two horizontal stripes, the upper red and the lower white, painted on the eastern side, erected on the outer end of Ricasoli breakwater, is exhibited, at an elevation of 40 feet above the sea, a *red occulting* light *every five seconds*, visible from a distance of 10 miles.

At the head of the Marsa a *fixed red* light is shown from the point at the foot of Jesuit hill, and a *fixed green* light near the boat shed on the opposite point.

Buoys.—The following red spar buoys lie in the harbour:—

One, in 33 feet of water, distant 200 feet, 290° true, from Isola watchtower, and another, in 32 feet of water, at a distance of 240 feet, 8° true, from the same tower.

One, about 70 yards eastward of the Gun wharf, marking the extreme of the shoal water off that point.

One, about 70 yards northward of Ras Hanzir (Magazine point).

Mooring buoys, the positions of which are marked upon Admiralty charts, are placed in Grand harbour, Bighi bay, Dockyard and Calcara creeks.

Dockyard and French creeks are exclusively for the use of Government vessels, and along the shores of the inner part of

General charts 2628, 194, 3670, 165, 2158a, b, 449.

Plan 974, Valletta harbours. Var. 7° 20′ W.

Dockyard creek are the dock and victualling yards; at its head is No. 1 dock, two dry docks, in line of, and entering from, one another. On the east side of French creek are Hamilton, No. 2, and Somerset, No. 3, docks; at the head Nos. 4 and 5 docks; and on the west side the naval store depôt and water-tanks at Corradino point. The channel to the docks at the head of French creek is being dredged to a depth of 35 feet, and the depth alongside the wharves to 32 feet.

Wharfage. — The various government wharves (1912) afford accommodation of a total length of 3,830 feet dredged to a depth of 32 feet, and of 460 feet dredged to a depth of 30 feet.

Pilots. — Pilot boats are distinguished by a red and white horizontal flag, and the words "Pilot boat" painted on the bows. In fine weather they board vessels outside the harbour. Rates of pilotage are given in Port regulations, Appendix VI.

Directions.—No special directions are necessary for entering the harbours of Valletta; there are no dangers, and ordinary precaution is all that is required.

The approach to the Grand harbour is exceedingly picturesque and interesting, and the fortifications most imposing. Passing St. Elmo lighthouse and fort on the starboard hand, and rounding the end of St. Elmo breakwater, Fort Ricasoli and its breakwater will be seen ahead; farther in the naval hospital, then Fort St. Angelo, with the town of Vittoriosa, and lastly Isola point and the town of Senglea or Isola. These towns unite with that of Burmola or Conspicua on the south, and the whole are surrounded, on the land side, by double lines of fortifications.

Under all circumstances it would be prudent for vessels of deep draught to avoid Dragut shoal. The passage over this shoal is not safe during a gregale (north-east gale) or when there is a heavy sea running.

The light-staff on Jezirah island in line with Tigne point bearing 248° true, will lead to the south-eastward of Dragut shoal; flagstaff on Fort St. Angelo in line with the viaduct between the two parts of St. Elmo breakwater, bearing 198° true, lead eastward of the shoal.

When inside St. Elmo breakwater the beacon on Corradino hill kept in line with the watch-tower on the north-west angle of the fort on Isola point, bearing 217° true, leads up the harbour, and about a quarter of a cable south-eastward of the shoal water off L'Imgherbeb point.

A sailing vessel, entering the Grand harbour with westerly winds, should keep the upper sails set to catch the flaws over the houses. With head winds it is, however, very difficult for a sailing vessel to enter, but as the sea under the land is smooth, by standing close in, the assistance of a tug can be obtained.

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Plan 974, Valletta harbours. Var. 7° 20′ W.

If forced to run for the port with a heavy breeze from the north-east, great caution is necessary if entering the Grand harbour, as on coming to the wind, the vessel's broadside is presented to the heavy sea then running at the entrance, and there is danger of being thrown upon the breakwater. Under such circumstances it is better to run for Marsa Musciet, when the sea will be aft, but since the building of the breakwaters there is a troublesome sea off the entrance, owing to the rebound.

In north-east gales pilots cannot get out, and the position of the buoys must not be relied on, as they are liable to break adrift.

VALLETTA (*Lat.35°54′N.,Long.14°31′E.*), the capital of the island, stands on a promontory forming a sort of ridge about 110 feet above the sea, nearly 1½ miles in length, and half a mile in breadth, which slopes on each side to the sea, separating the Grand harbour from that of Marsa Musciet, and having at its extremity the fort and light-tower of St. Elmo. It was founded, in 1566, by the famous grand master, John de la Valletta.

The houses are well built, with flat roofs, the streets are wide, and at right angles to each other, with commodious footpaths on each side, while a road runs round the whole city between the houses and fortifications. The ground on which the city is built is so steep that many of the streets leading to the Strada Reale consist of a flight of stairs.

The public buildings are the palace, university, treasury, the churches of St. John and St. Paul and several other churches, barracks, several hospitals, the opera house, palace of justice, library, museum, &c., all of which are well and neatly built; the church of St. Paul, with its tall spire, was the gift of Queen Adelaide, and is a conspicuous object. Between Valletta and the inner lines of the fortifications is the suburb of Floriana, with the public gardens, parade ground, &c.

Water is supplied by an aqueduct, but every house has a tank for rain-water, and there are numerous wells. Granaries are excavated in the rock for the safe keeping of grain.

Communications. — The Peninsula and Oriental Company's steamers for London, and the Moss line of steamers for Liverpool, call fortnightly; two service of steamers daily to Gozo; for other steamers, *see* page 26.

A railway connects Valletta with Citta Vecchia, a distance of 8 miles.

An electric tramway runs from Floriana to Birchircara, Zebbug, and round the head of the Grand harbour to the Dockyard.

There is telegraphic communication with all parts by cable; the inland telegraph system is the property of the military authorities. The telegraph office is always open. The Governor's palace, and all

Plan 974, Valletta harbours. Var. 7° 20′ W.

public departments are connected by a telephone service, and the island of Gozo can be communicated with from the Auberge de Castille through the military telephone.

Submarine telegraph cables. — Submarine telegraphic cables are laid between Malta and the following places: From Valletta to Bona, Gibraltar, Pozzalo, in Sicily, and Alexandria; these cables are connected with Valletta by land lines, also by submarine cables crossing Sliema creek and Julian bay; a cable to Tripoli on the south. A submarine telephone cable crosses the entrance to Grand harbour from Ricasoli lighthouse to St. Elmo breakwater lighthouse, and another from L'Imgherbeb point to St. Angelo.

Coal and supplies.—All coal is kept at the Marsa. An aggregate amount of about 60,000 tons of coal is kept in stock by various firms, and 5,000 tons could be put on board in 24 hours; coaling is carried on by baskets, and there are 700 lighters holding from 25 to 30 tons each, 200 being kept ready loaded, and 7 steam launches. The coal wharf, 2,500 feet in length, has depths of from 12 to 15 feet alongside; colliers generally lie alongside lighters, the coal being carried across them.

All naval coal is kept at the Marsa, and some patent fuel at Imsida.

Provisions and stores are abundant. Water is supplied to all Government vessels from the Naval reservoir by tank vessel. Merchant vessels receive it also by tank vessel.

Trade. — The exports of local produce consist of potatoes, onions, cumin seed, vegetables, oranges, cotton, goats, mules, and Malta freestone; and the principal imports are wheat, manufactured grain, wine, cotton goods, spirits, beer, and bullocks; 330,000 tons of coal are imported annually.

In 1910 the total value of imports (exclusive of goods imported for transhipment) was valued at £2,356,043, and exports (exclusive of goods for transhipment) £863,429.

Shipping. — In 1910, 2,391 steam vessels, with a total tonnage of 4,305,478 tons, entered the port, and 668 sailing vessels, with a total tonnage of 32,258 tons.

Docks.—There are two double and four single Government docks in Dockyard and French creeks, a hydraulic dock at Imsida creek, and a patent slip at French creek and one at the Marsa. For particulars, *see* Appendix I.

Repairs. — Machinery of the largest battleships can be repaired, and engines of 1,200 h.p. have been made. A hydraulic crane will lift 160 tons; a steam crane 40 tons, also cranes to lift 20 and 50 tons; sheers 30 tons; and several smaller cranes. There are a number of steam hammers, the largest being 50 cwt.

Hospitals. — In addition to the Naval and Military hospitals, there is a hospital for seamen at Floriana.

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Lloyd's signal station.—A Lloyd's signal station is situated at the Palace tower, Valletta.

Signals.—No vessel is permitted, during night time, to make use of any private signals, off any bay or creek of the islands; the only authorised signals being:—

(*a*) A vessel requiring a pilot to burn a blue light;

(*b*) A vessel in distress to use the signal authorised under the Merchant Shipping Act.

When any of H.M. vessels are entering or leaving the harbours, a blue and white flag, with a red flag above, will be hoisted on the Custom-house, for the Grand harbour, and on the Police station at Marsa Musciet, for that harbour, as a warning that all fishing nets near the fairways are to be removed.

Time signal.—A time ball is dropped daily at noon from the flagstaff on the Auberge de Castille, Valletta. The ball is hoisted close up at 23h. 57m., and dropped by electricity at 0h. 0m. 0s. Mid-European time, corresponding to 23h. 0m. 0s. Greenwich mean time.

A gun is fired by the same circuit which drops the ball, at the upper Barracca saluting battery.

Should either the gun or ball fail in accuracy, the ball will be dropped again 0h. 10m. 0s. Mid-European mean time. The gun will not be fired a second time.

Harbour regulations.—Port regulations, and regulations as to landing men from foreign warships and transports, are given in Appendix VI.

Quarantine regulations.—Vessels not permitted to enter the harbour are allowed to communicate, in quarantine, with the islands Comino and Cominotto, under such restrictions as the Collector of Customs may direct.

Some vessels are allowed to enter Quarantine harbour to coal and take in provisions under quarantine restrictions.

Tides.—It is high water, full and change, in Valletta harbour, at IIIh. 30m.; springs rise from 10 to 14 inches, approximately.

Plan 2628, Malta island, south-east portion.

SOUTH-EAST COAST.—From Fort Ricasoli the coast of Malta trends to the south-east for $3\frac{2}{10}$ miles to Ponta tal Zonkor (*Lat. 35° 52′ N., Long. 14° 34′ E.*), the coast rising, with a gradual slope, from the water's edge to the ridge running parallel to it, which is from 150 to 250 feet above the sea; at 6 cables from Fort Ricasoli is a small creek named Calanca tal Patriet, in which, at Wied il Hammick and close to the shore, is situated a rifle range.

Rifle range.—Buoys.—Two red conical buoys, surmounted by a staff and globe, are moored about one mile off the creek to mark the limits of the fire zone from the rifle range.

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Lines drawn from the head of Calanca tal Patriet, through these buoys, enclose the dangerous area, and two danger flags are shown, whilst firing is going on to seaward, from flagstaffs surmounting two small white lookout houses, one on each side of the creek.

Prohibited fishing ground. — A red conical buoy, surmounted by staff and cage, is situated with the outer of the north-western pair of beacons marking the measured mile bearing 196° true, distant 5½ cables. A beacon lies near the coast, about 2 cables north-westward of the same measured mile beacon, and another beacon lies near the coast close eastward of the north-eastern extreme of Fort Ricasoli.

Fishing is prohibited inside the area comprised between lines drawn between the western rifle range buoy and the beacon eastward of Fort Ricasoli; between the rifle range buoys and continued to the buoy with staff and cage; and from the latter buoy to the beacon north-westward of measured mile beacon.

Measured mile.—Beacons.—Between the entrance of Valletta harbour and Ponta tal Zonkor, is a measured mile marked by beacons. Length 6,080 feet, true course 309°.

The western pair of beacons, situated 7½ cables south-eastward of Calanca tal Patriet, are masts, the outer surmounted by a black staff and diamond, the inner by a staff and ball.

The eastern beacons are similar, but the inner beacon is surmounted by a globe; the walls of the fields intervening are marked with two white stripes, which are in line with the two beacons in transit. Torre ta Trick il Wiesa, a ruined tower, 32 feet in height, stands near the outer of the eastern beacons.

Della Larga Forca (*Lat. 35° 53′ N., Long. 14° 35′ E.*), a bank with a least depth of 5 fathoms, lies with Torre ta Trick il Wiesa bearing 242° true, distant 3½ cables; the bank extends in a northerly direction from this position to the 10-fathom line for a distance of 3 cables; there is a channel about 2 cables in width, between the 5-fathom bank and the shore, in which the depths are 9 fathoms, but deep-draught vessels are recommended not to use it.

The eastern measured mile beacons in line lead over the 5 fathoms on Della Larga Forca.

Ponta tal Zonkor, on the northern side of the entrance to Marsa Scala, is low, and has a beacon, presently described, standing one cable from its extremity.

Zonkor reef, a rocky shoal about one cable in width, between the 5-fathom lines, stretches 4 cables south-eastward of the point; here there is a depth of 4¾ fathoms, with 5½ to 6 fathoms immediately to the south-eastward.

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Plan 2628, Malta island, south-east portion. Var. 7° 20′ W.

A rocky head, with 5 fathoms least water over, and 15 to 20 fathoms close seaward of it, lies 4½ cables eastward of Ponta tal Zonkor.

Marsa Scala, the narrow inlet between Ponta tal Zonkor and Il Gzira, is about 6½ cables deep, and 3½ cables wide at its entrance. The water shoals suddenly just inside the entrance from 5 to 2 fathoms, thence to half a fathom at its head.

Fort St. Thomas, an old castle, is a white rectangular building, 85 feet in height, with corner turrets and stands on the south side of the entrance to the Marsa.

Beacons.—On the north side of the entrance to Marsa Scala, and one cable westward of Ponta tal Zonkor there is a stone beacon, with black and white horizontal bands.

On the extremity of Il Gzira, the south point of entrance, a red iron beacon, 17 feet in height, is surmounted by a staff and cage.

Ir Ramla ta San Tumas, or St. Thomas bay, formed between Il Gzira and Ponta tal Munsciar, is nearly three-quarters of a mile wide, and 6 cables deep, with 4½ and 5 fathoms water in the centre; it is foul and rocky, the bottom consisting of sand and rocks covered by weed; there is a sandy beach at its head. A sunken rock, with a depth of 8 feet over it, lies near the centre of the bay, 2½ cables 317° true, from the extreme of Ponta tal Munsciar; like Marsa Scala this bay is completely open to the eastward.

Ponta tal Munsciar will be known by its being the northern point of a range of high white cliffs; the point terminates in rocks, from which a reef, with several heads of less than 6 feet water, extends east-north-eastward, for a distance of 3¾ cables.

Secca il Munsciar (*Lat. 35° 51′ N., Long. 14° 35′ E.*), about 2 cables in extent, with 1¾ fathoms least water over it, and 6 to 8 fathoms around, lies about 8 cables eastward from Ponta tal Munsciar. Between this reef and that extending from Ponta tal Munsciar is Munsciar pass, with 4 fathoms in mid-channel; the bottom of the pass is uneven and rocky.

Zonkor beacon in line with Il Gzira beacon, bearing 333° true, leads through the centre of the pass in 4 fathoms water. Dellimara lighthouse just open of Shirob il Ghagin, bearing 211° true, also leads through the pass, in 4 fathoms water.

Outer Munsciar rock, having a depth of 5½ fathoms, lies east-south-eastward, distant nearly 4 cables, from the shoalest part of Secca il Munsciar.

The irregular outline and uneven depths on the bank, which extends 1¼ miles eastward of Ponta tal Munsciar and around these reefs, cause a heavy sea during easterly winds, when a vessel should give them a wide berth.

Buoy.—A red conical buoy, surmounted by a staff and cage, is moored on the northern side of Outer Munsciar rock.

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Plan 2628, Malta island, south-east portion. Var. 7° 20′ W.

Clearing marks. — St. Elmo lighthouse open north-east of Ricasoli ridge, bearing 299° true, or St. Elmo breakwater light, visible, bearing 303° true, leads a mile to the north-eastward of Secca il Munsciar; and Dellimara lighthouse, bearing 233° true, leads southward of it.

Shirob il Ghagin, half a mile southward of Ponta tal Munsciar, is low and projecting, with a ruined tower, which is gradually disappearing, standing on it; the coast between, of high white cliffs, forming a bay, and rising at its head to 145 feet above the sea, this being the highest cliff to the northward of Dellimara point.

To the southward of Shirob il Ghagin are two small bays named respectively Cala ta Lihfar and Zgheira in the form of a horse-shoe, with high white cliffs at their heads; thence on to Dellimara point the coast is irregular and cliffy.

Signal station.—Fort ta Silc signal station, 223 feet above the sea, is situated about three-quarters of a mile westward of Shirob il Ghagin tower, and is conspicuously marked by a flagstaff and semaphore. *See* view on plan.

MARSA SCIROCCO. — The entrance to this bay, between Dellimara and Binghaisa points, is about a mile wide, and widens slightly within the entrance; it extends about 1½ miles to the northward and north-westward, being divided at its head by the promontory of St. Lucian, which is broad with white cliffs from 50 to 60 feet above the sea, and on which stands Fort St. Lucian, a large square building with corner turrets. A small rock, Hajra, 2 feet in height, with foul ground round it, lies 1½ cables south-eastward of the promontory.

On the eastern side of the bay the coast, for a little more than a quarter of a mile north of Dellimara point, is a bold yellow cliff, from 70 to 120 feet above the sea; thence it becomes less precipitous until half a mile further north it again breaks on to the high white cliff named Il Hotba tal Bies, 152 feet above the sea.

The coast on the western side of the bay is low, and rises gradually towards the interior of the island; there are the ruins of several old batteries and fortifications on this side of the bay.

Dellimara point, terminating in a cliff 50 feet above the sea, has a square white tower, 35 feet in height, standing on it, and forms the eastern side of the entrance to Marsa Scirocco. Lying close to the southward of the point is Il Taktigha ta Marsa Scirocco, a small low islet, 13 feet above the sea and foul for the distance of half a cable seaward.

LIGHTS (*Lat. 35° 50′ N., Long. 14° 34′ E.*).—At the distance of 2 cables from the extremity of Dellimara point is an octagonal tower,

Plan 2628, Malta island, south-east portion. Var. 7° 20′ W.

80 feet in height, surmounting a dwelling; it exhibits, at an elevation of 151 feet above the sea, an *alternating revolving red* and *white* light, showing *red* and *white* alternately *every thirty seconds*, and is visible in clear weather from a distance of 15 miles. For arc of visibility, *see* Light list and plan.

On the south face of Fort St. Lucian, an iron structure, 12 feet in height, exhibits, at an elevation of 127 feet above the sea, an unwatched *fixed white* light, visible in clear weather from a distance of 6 miles. For arc of visibility, *see* Light list and plan.

A *fixed red* light is occasionally shown on Cala Frana torpedo depôt pier.

Beacon. — A beacon with triangular top, painted with red and white bands, is situated on the point north-eastward of Fort St. Lucian.

Binghaisa point, on the western side of the entrance to Marsa Scirocco, is low and has a square pink tower, with a vertical black stripe on its eastern face, 40 feet in height, standing on it; there are also the ruined walls of old fortifications.

Binghaisa patch lying 3 cables southward of Binghaisa point, is a rocky shoal about 1½ cables in extent, with 3 fathoms least water over it; there are depths of from 4 to 6 fathoms between the shoal and the shore.

Binghaisa reef (*Lat. 35° 48′ N., Long. 14° 34′ E.*) is a rocky shoal extending about 3½ cables in a north-west and south-east direction, with shoal heads on which the depths are from 3 to 5 fathoms; the reef rises gradually on its eastern side, but falls abruptly at its western edge to depths of 20 and 30 fathoms. The north-west end of the reef is 4½ cables, south-eastward of Binghaisa patch, with depths of from 7 to 10 fathoms between them.

The outer head of 3¾ fathoms lies one mile south-eastward of Binghaisa tower.

The sea breaks heavily on the reef with on-shore winds, but they afford some shelter to Marsa Scirocco with southerly winds.

Clearing marks. — Torri tal Wied Zurriek (plan 2629) kept open of land bearing 288° true, leads to the southward of Binghaisa reef. The Capucin convent, on the ridge south of Zeitun, in line with the centre of Fort St. Lucian, bearing 334° true; or Zeitun church well open to the eastward of the same, leads to the eastward. *See* view A on plan.

Cala Frana.—Torpedo range.—Cala Frana is a small bay situated on the south side of Marsa Scirocco, westward of Binghaisa point. The torpedo depôt is erected on its western shore, a pier, 570 feet long, extending in a northerly direction; this pier is used for running torpedoes from, and has a length of 60 feet at its head,

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Plan 2628, Malta island, south-east portion. Var. 7° 20′ W.

with a depth of 33 feet alongside. Two mooring buoys, for the use of petrol vessels, lie off the pier. The torpedo range, with its various mark-buoys, extends for a distance of 2 miles in an east-south-easterly direction southward of Dellimara point. The danger limits of the range when in use are marked by circular red buoys, each surmounted by a staff and globe; there are a number of beacons erected on shore used in connection with the marking of this range. A small concrete jetty is situated on the western shore of Cala Frana for landing stores, &c.; there is a depth of 12 feet alongside.

The torpedo depôt is in telephonic communication with Valletta; a large water-tower stands on its side, and forms a conspicuous object. A breakwater, 290 feet long, extends in a north-westerly direction from the outer bend of the eastern shore of Cala Frana for the protection of small craft belonging to the depôt. Several rocky heads, with varying depths of from 2 to 6 feet, are scattered about the centre and toward the head of the bay, so that nothing larger than a boat should at present attempt to use Cala Frana for shelter purposes, and torpedo boats using the jetty on its western shore should exercise caution, as the water shoals very rapidly on the inside of the jetty.

The torpedo range buoys are not to be depended upon for navigational purposes, as the four outer buoys are only laid down when long ranges are in use, and the raft moorings depend on the weather.

Mooring buoys. — There are two mooring buoys in Marsa Scirocco; their position will be seen on the chart.

Anchorage (*Lat. 35° 49′ N., Long. 14° 33′ E.*).—Marsa Scirocco is clear of danger, with from 10 to 13 fathoms water in the centre, the soundings diminishing gradually towards the shore. The north-east arm is shallow, and a narrow bank surrounds this part of the bay. Marsa Scirocco is a very safe harbour, except with southerly winds, and even these seldom blow home; the bottom is fine sand and mud between patches of hard ground covered with weed, and affords good holding ground; small vessels generally anchor off the eastern shore, with Fort St. Lucian bearing about 283° true.

Examination anchorage.—An area for the examination of vessels, under the circumstances described inside the cover of this book, has been appropriated in Marsa Scirocco.

Vessels inconvenienced by searchlights.—For signals to be made, *see* page 494.

Directions. — Vessels bound to Marsa Scirocco from the north-east may round Dellimara point at any convenient distance; but from the southward and westward should attend to the clearing marks.

At night, Dellimara light should be kept bearing westward of 356° true until Fort St. Lucian light bears 334° true.

General charts 194, 3670, 165, 1800, 2158a, b, 449.

Plan 2628, Malta island, south-east portion. Var. 7° 20′ W.

Current. — About one mile off the entrance to Marsa Scirocco a very strong current setting to the north-eastward has been experienced. It apparently was caused by several days of south-easterly winds, as it ceased after two days' westerly winds.

Villages. — The village of Marsa Scirocco lies at the head of the north-east arm of the bay, with two small churches and several conspicuous houses and the two small villages of San Giorgio and Birzebbugia, separated by the low promontory, Il Gzira, are on the western side of the bay. There is a landing place for small boats drawing 4 feet at the police station, on the north side of the bay, in which Birzebbugia is situated.

Zeitun. — The town of Zeitun, with its conspicuous church with red dome, and two spires, stands on the ridge of the hill, 1½ miles north of Fort St. Lucian; a quarter of a mile south-east of Zeitun church is the low white dome of the church of San Gregorio.

Situated on the ridge, about one mile westward of Zeitun, is the town of Ghashiak, having a church with dome and two spires, and half a mile further west is the old signal tower, round, 55 feet in height and standing at the eastern end of the village of Gudia, which has a church with a dome and two spires.

On the ridge, nearly a mile northward of Fort St. Lucian, is the Capucin convent, a large dark house, which, with Fort St. Lucian, forms a clearing mark for Binghaisa reef, when entering the bay.

Submarine telegraph cable. — A telegraph cable from Malta to Tripoli runs through Marsa Scirocco, and is landed in Cala San Giorgio.

Chart 194, Malta and Gozo islands.

Hurd bank (*Lat. 35° 54′ N., Long. 14° 46′ E.*) lies 11 miles eastward from the entrance of Valletta harbour. It is about 4 miles long N.E. and S.W., and about 2 miles in breadth; on it are depths of from 23 to 27 fathoms, over sand and coral bottom.

Plan 2629, Malta island, part of south coast, &c.

SOUTH-WEST COAST. — From Binghaisa point the coast trends to the westward, and for a distance of 3½ miles, as far as a bold headland, named Cap tal Baitar, is a continuous range of high precipitous cliffs, gradually increasing in height from 100 to 300 feet above the sea.

From Cap tal Baitar to Torri tal Wied Zurriek, a distance of one mile, the cliffs are still high, but more broken and less precipitous and much darker in colour. Negret mill, standing on the high land above Cap tal Baitar, 519 feet above the sea, is a conspicuous object.

General charts 3670, 165, 1800, 2158a, b, 449.

Plan 2629, Malta island, part of south coast, &c. Var. 7° 30′ W.

From Torri tal Wied Zurriek, a square pink tower, 38 feet in height, to Kalp is Sabia, the land is lower, and there are no cliffs of any height, but the coast rises steeply from the water's edge to the summits of the hills, a quarter of a mile back, which are of about 450 feet above the sea.

Ras il Hamriah, three-quarters of a mile westward of Torri tal Wied Zurriek, is an irregular projection from the coast, and, on the side of the hill above it, is Torri Hamriah, 34 feet in height, and of a yellow colour. One mile westward of Ras il Hamriah, and close to the shore, is a small rock, 2 feet above the sea, named Hajra is Seuda.

Hamriah bank (*Lat. 35° 49′ N., Long. 14° 26′ E.*), with general depths of from 5 to 10 fathoms, fronts the coast between Ras il Hamriah and Hajra is Seuda, extends 6 cables from the shore, and is very rocky and uneven, with several shoal heads of from 3 to 5 fathoms over it.

The eastern head, with a depth of 3 fathoms, lies with Torri Hamriah bearing 17° true, distant 4½ cables. There is a depth of 4¾ fathoms 2 cables westward of this position, and 4½ fathoms 2 cables north-west of it.

The western head, with a depth of 4¾ fathoms, lies with Torri Hamriah bearing 86° true, distant 8½ cables; there is a depth of 5¾ fathoms 2 cables south-east of it.

A rock, with 5 feet least water over it, lies south-westward from Torri Hamriah, and at about a cable from the shore.

Nowhere along this coast is there any sheltered anchorage, but, with the exception of Hamriah bank, it is clear of danger and steep-to, the 50-fathom line of soundings being within a quarter of a mile from, and in places, close to, the cliffs, except the bank, which extends from the coast to Filfola island, and half a mile south of it.

Current. — With fresh westerly, or north-westerly, winds, a current setting along the shore to the westward is sometimes experienced; this current extends from half a mile to one mile from the shore, with a velocity of from half a knot to one knot an hour.

Filfola island, 2½ miles southward of Ras il Hamriah, and 2½ miles from the coast, is cliffy, rocky, and 190 feet above the sea; it is 2 cables long, east and west, and one cable broad. Two rocks, 51 and 29 feet above the sea respectively, lie at its western end, to which they are nearly united; there is a rock awash two-thirds of a cable west of the western rock, and a small rock, 2 feet above the sea, lies at the east end of the island.

Stork rock, with a least depth of 3¾ fathoms, and 7 to 20 fathoms close around, lies 4 cables southward of Filfola island; and two patches, with 3 fathoms water over them, lie between Stork rock and the island.

General charts 194, 3670, 165, 1800, 2158a, b, 449.

Chart 194, Malta and Gozo islands. Var. 7° 30′ W.

Coast.—From Kalp is Sabia the coast trends to the north-west to Ras ir Raheb, a distance of 6½ miles, and is a continuous wall of high cliffs, remarkable not only for their high and precipitous character, but from the fact that within a quarter of a mile from the coast, they rise to the most elevated land of the island, culminating near the village of Dingli in a hill 845 feet above the sea; Jebel Giantar summit, one mile to the eastward, being only 5 feet lower.

At the foot of these cliffs are various caves or grottoes which are full of stalactites and stalagmites.

Signal station.—There is a signal station and semaphore on the summit, near Dingli.

Plan 2063, Malta island, northern portion.

Ras ir Raheb (*Lat. 35° 54′ N., Long. 14° 20′ E.*) is the northern extreme of the perpendicular cliffs which form the coastline of Malta for a distance of 13½ miles on the south and west. The cape is precipitous, 156 feet above the sea, with deep water alongside.

Fom ir Rieh is a bight extending eastward from Ras ir Raheb for about half a mile. The southern side of the bight is a perpendicular cliff, steep-to, but the northern side is broken and foul ground extends some distance from the shore.

Anchorage, with excellent shelter from easterly winds, will be found in the bay.

Beacons.—A pyramidal beacon with black and white horizontal stripes is situated at the extreme of Ras ir Raheb, and two others of a similar nature are situated near the summit of Rdum Ahmar on the northern side of the bay. These beacons are low, hard to distinguish from a distance, and are used for calibrating purposes.

Ras il Pelligrin, one mile northward of Ras ir Raheb, is the extreme of Sicca tal Imjieles. The coast between this point and Fom ir Rieh consists of boulders that have slipped from the steep slopes above, and there are many off-lying rocks inside the 10-fathom line. Off the northern side of Ras il Pelligrin there is a rock, just awash, 100 yards distant from the coastline, so this point should be given a wide berth, even by boats.

Jneina.—On the north side of Sicca tal Imjieles the coast turns into the little bay of Jneina, where there is a beach and good landing, but it is too confined for vessels, which will find anchorage in Ghain Tuffiha immediately to northward of, and separated from, Jneina by a remarkable-looking rocky peninsula named Ras il Karabba.

Rifle range.—Buoys.—Two buoys mark the limit of the danger zone of fire from the rifle range at Ghain Tuffiha, and vessels should on no account pass inshore of them. Both buoys are red conical, surmounted by a staff and cage, and moored 3½ cables apart about one mile seaward from the rifle butts.

General charts 194, 3670, 165, 2158a, b, 449.

Plan 2063, Malta island, northern portion. Var. 7° 30′ W.

Directions.—In entering Jneina the rock awash off Ras il Pelligrin will be cleared by keeping the solitary house, just above the beach, open of the extreme of Sicca tal Imjieles, bearing about 120° true; and to anchor in Ghain Tuffiha keep in the centre of the bay, and anchor when Gozo island is shut in by the rocks under Ras il Uash, bearing 310° true.

Communication. — At the heads of both Jneina and Ghain Tuffiha there are lookout towers; the former, named Torri ta Lippia, is connected by telegraph with Valletta Custom-house.

Coast. — From Ghain Tuffiha to the northward the coast is still composed of boulders, with steep slopes, and sometimes cliffs behind them. Off Ras il Uash, which forms the northern point of Ghain Tuffiha, there is foul ground, which will be avoided by vessels keeping the western part of Cominotto open westward of the rocks under Ras il Kammieh, bearing about 1° true.

Plan of Ras in Nieshfa bay on 2063.

Ras in Nieshfa bay is formed by the point of that name and Ras il Kammieh, about three-quarters of a mile to the north-westward. The northern shore is bold and steep-to; the eastern side is studded with rocks or boulders. There are two mooring buoys in the north-eastern corner for H.M. vessels calibrating. There are also four beacons on the edge of the cliffs, and one about 1½ cables inland from the north-eastern corner of the bay. These beacons are used, in connection with those along the coast as far as Ras ir Raheb, for calibrating purposes.

Landing. — Between Ras il Uash and Ras il Kammieh, there is only one place available for landing, which is at Il Praüet, a rocky cove on the south side of Ras in Nieshfa; to enter the cove, boats should keep close to the cliff on the south side, as there are many sunken rocks under Ras in Nieshfa.

Plan 2063.

Ras il Kammieh (*Lat. 35° 58′ N., Long. 14° 19′ E.*) is of similar appearance to the other headlands immediately south of it, with cliffs and very steep slopes below, strewn with boulders, which also form the coastline; Ras il Kammieh rises to 410 feet above the sea. Foul ground extends from it to the westward for a distance of 3 cables, and will be cleared by keeping the eastern extreme of Comino in line with the western extreme of Skol tal Marfa, bearing 45° true.

Anchorage. — There is anchorage in the little bay of Ich Chirkeuua, between Ras il Kammieh and Ponta tal Marfa; the bottom is sandy.

Tunny fishery. — Tunny nets are laid out during the season northward of Ras il Uash and northward of Ras il Kammieh. For Lights, marks, and caution, *see* page 73.

General charts 194, 3670, 165, 2158a, b, 449.

Plan 2063, Malta island, northern portion. Var. 7° 30′ W.

Ponta tal Marfa is low, with high sloping ground behind. It is steep-to on its southern side, but a ledge extends, under water, from the low rock off the point, named Skol tal Marfa, which should not be approached within a distance of 2 cables.

Chart 2158a, Mediterranean sea, western sheet.

Medina bank (*Lat. 34° 57′ N., Long. 15° 12′ E.*) was discovered by H.M. surveying vessel *Medina* in the year 1862; this bank, within the 100-fathom line of soundings, is about 20 miles long in a north and south direction and about 16 miles broad, the bottom consisting of sand, mud, and shells. The shoalest part, 74 fathoms, lies 152° true, distant 60 miles from the east extreme of Malta.

Plan of Linosa island on 193.

ISOLA DI LINOSA (ancient Algusa) lies 142° true, distant 65 miles from Pantellaria, and 259° true, distant 63 miles from Cape San Dimitri, the north-west extreme of Gozo, and is inhabited by a small Italian colony employed in husbandry, and who export vegetables and farm produce to Girgenti. This island, with Lampedusa and the islet of Lampion, are the Pelagie isles of the ancients, and both belong to Italy.

Linosa, of an irregular quadrilateral shape, is about 6 miles in circuit, and the summit is a crater 528 feet above the sea; it is entirely volcanic, with an extinct crater on its north-eastern side, and three smaller, but not less marked, to the southward. There are three hilly ranges, with good valleys between them, covered with a rich vegetation.

Isola di Linosa.

Monte Rosso, 610 feet above the sea, may be seen, in clear weather, from a distance of 30 or 35 miles, when it has the appearance of two islets, but on closing it, the hills and valleys are defined. Punta Calcarella (Strepito), the south extreme, is high and bluff, and, at the distance of about 2¼ cables eastward from it, is a small rocky shoal with 2¼ fathoms water over it; the bottom in the neighbourhood is also rocky. Punta Arena Bianca (Sciarazza), the south-west point, is low and rugged. *See* view on plan.

General charts 3670, 165, 2158a, b, 449.

Plan of Linosa island on 193. Var. 8° W.

LIGHT (*Lat. 35° 52′ N., Long. 12° 53′ E.*).—On Punta Beppe Tuccio (Vergogna), a white truncated conical tower, 56 feet in height, with keeper's dwelling attached, exhibits, at an elevation of 105 feet above the sea, a *flashing white* light *every ten seconds*, and showing a *flash* for *two seconds*, followed by an eclipse of *eight seconds;* it is visible in clear weather from a distance of 16 miles. For arcs of visibility *see* Light list and charts.

Village.—The village of Linosa is situated on the south-west side of the island, about half a mile from Cala Pozzolana on the west coast.

Communication. — There is communication alternately every week by steamers, with Trapani and Porto Empedocle.

Supplies.—Goats, sheep, poultry, and eggs may be procured, and water from tanks, but in very limited quantity.

Landing, on a beach of fine sand, may be effected on the south side of Cala Pozzolana.

Anchorage, over sandy bottom, may be obtained off the south coast between Punta Arena Bianca and Punta Calcarella; on the east coast of Faraglioni and on the west coast in Cala Pozzolana.

Plan of Lampedusa isles on 193.

LAMPEDUSA, the ancient Lopadusa, lies 24 miles to the south-west of Linosa, and is 6 miles in length in an east-south-east and west-north-west direction, with an average breadth of a mile, its eastern part being the broadest; it has about 2,500 inhabitants, of whom 500 are convicts. Its surface is level, but the coast is abrupt and rugged, except on the south-east, where it shelves to a low shore. Monte Albero Sole, 436 feet above the sea, on the north side of the island, near its west extreme, is the greatest elevation.

Lampedusa is composed of sedimentary calcareous formations similar to the adjacent coast.

Capo Ponente, the west extreme, is a perpendicular cliff, the land over it being 400 feet above the sea and woody; it is steep-to, and may be rounded at any convenient distance. On the south side of the island, 2¼ miles from the cape, is Isola Conigli, 89 feet high, steep, and connected to the main island by a reef; on the south side of the islet are two rocks, the western being low, but the islet and rocks are not seen until near, being blended with the white cliffs of the coast.

At 2¼ miles farther eastward is the entrance to Il Porto, the intermediate coast being indented with several small bays or inlets. It is

General charts 3670, 165, 2158a, b, 449.

Plan of Lampedusa isles on 193. Var. 8° W.

all along, as far as is known, clear of danger, with from 22 to 35 fathoms water at half a mile from the coast.

Plan of Lampedusa harbour on 193.

Il Porto is about 3½ cables deep, with from 12 fathoms water at the entrance, shoaling to 3 fathoms at 2 cables within, and, being open to the south-west, a swell sets in when the wind is from that quarter. The entrance is rather more than 1½ cables wide, and within there are three small, shallow bays with beaches.

Punta Guitgia, on the west side of the entrance, is bordered by a shoal which extends off about a third of a cable; Punta Cavallo Bianco is clear of danger on its west side, but has shoal water extending half a cable south of it. On the projecting point facing the entrance, and which separates the two bays, Cala Palma and Cala Salina, at the head of the harbour, are the remains of a castle, a chapel, some houses, and the health office. Dredging operations are in progress in Cala Salina, the depth of which is to be increased to 13 feet.

LIGHTS (*Lat. 35° 30′ N., Long. 12° 36′ E.*).—On Punta Cavallo Bianco, the point on the east side of the entrance to the port, an *occulting green* light *every ten seconds*, thus:—light, *seven seconds;* eclipse, *three seconds*, is exhibited, at an elevation of 59 feet above the sea, from an iron standard on a masonry building, the whole 20 feet high; it is visible in clear weather from a distance of 7 miles. For arc of visibility, *see* Light list.

On Punta Guitgia, the west side of the entrance, a *fixed red* light is exhibited, at an elevation of 41 feet above the sea, from a similar structure to the preceding light; it is visible in clear weather from a distance of 5 miles.

Anchorage.—A large vessel will obtain anchorage about 1½ cables outside the entrance, in 8 fathoms water.

Communication.—There is communication by steamer every week alternately to Porto Empedocle and Trapani, and frequently by sailing vessel with the coast of Africa, especially with Mahediah and Sfax; telegrams should be sent by steamer to Porto Empedocle.

Supplies of fresh provisions are scarce; water of poor quality may be obtained in Cala Palma.

Plan of Lampedusa isles on 193.

Cala Pisana.—Punta Sottile (the south-east extreme of Lampedusa), 1½ miles eastward of the harbour, is low, and west of it, formed between cliffs, is Cala Francese, with 4 fathoms water. The north-east extreme of the island is named Capo Grecale, and the coast between it and the south-east extreme forms a bay in which are two coves named Cala Pisana and Cala Creta; Cala Pisana is narrow, but between 2 and 3 cables deep, terminating in a steep beach. This part of the island is sheltered from westerly winds. Here, in 1551, the

Plan of Lampedusa isles on 193. Var. 8° W.

celebrated Andrea Doria anchored the fleet of Charles V., after an engagement with the Turks, that was followed by a gale from the south-west.

The north coast of the island is bold and steep-to, having about 35 fathoms water, at a distance of half a mile.

LIGHT (*Lat. 35° 31′ N., Long. 12°. 38′ E.*).—A white octagonal tower, 56 feet in height, on Capo Grecale, exhibits, at an elevation of 213 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 21 miles. *For* arc of visibility, *see* Light list.

Lampion islet (ancient Scola), 8 miles westward from Capo Ponente, the west extreme of Lampedusa, is a steep, tabled, and triangular islet, which is about 3 cables in length north and south, and 1½ cables in breadth; it is of the same formation as Lampedusa. Its surface is so flat that on making it from the north-west it looks like a wall, and there are vestiges of buildings of an ancient date on its summit.

It is steep on its west, north-east, and south-west sides, in cliffs of from 120 to 140 feet high, shelving on its east side to a low point, much frequented by seals. It is steep-to all round, with from 10 to 20 fathoms water close in, except at the low eastern point, from which a shoal extends off about a cable.

Chart 3670, Malta channel.

DIRECTIONS from Malta westward. — Sailing vessels bound to the westward from Malta during north-west and westerly gales (instead of vainly contending against a heavy sea and strong current, in the channel between Gozo and Sicily), are recommended to run to leeward of the island, and stand over on the starboard tack until they sight the coast of Africa, then work to windward in smooth water as far as Cap Bon.

Should westerly gales still prevail when in the neighbourhood of Cap Bon, a sheltered anchorage under it, or along the coast to the southward, is available, and from this any change of wind may be taken advantage of.

The following is by Sir William Reid, K.C.B., sometime Governor of Malta, and author of the well-known work on the Laws of Storms.

" A residence of four years in Malta has convinced me that the gales and storms of the Mediterranean sea follow the same general laws as the revolving winds in corresponding latitudes in the Atlantic, modified no doubt by the high land which surrounds this sea and by the African continent. The same may be said of Malta as was said of Bermuda, namely, that after the commencement of November, revolv-

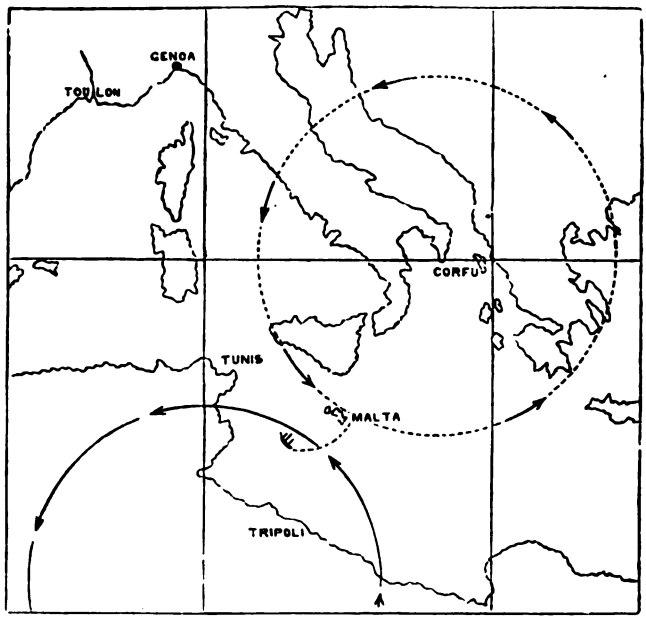
Chart 3670, Malta channel. Var. 8° W.

ing winds of various degrees of force set in, and gradually become frequent; yet they seldom follow in such rapid succession as that one gale becomes confounded with another, light winds and very fine weather usually intervene between the passage of revolving winds; while at other times hard-blowing, straight-line winds, with a high barometer, intervene.

"Seamen who have studied the theory of the revolving winds will be able to estimate the probable advantage they may derive from the altering of the wind during the winter season by following the course indicated by Captain Graves.

"Vessels sailing from the harbours of Valletta at that season, with the barometer rising, and a westerly wind altering and moderating, by steering southerly would come up as the wind alters towards the north. If a calm should follow, the next breeze would probably blow from the eastward, because at that season of the year revolving gales follow in close succession, and in their northern portion the wind is easterly.

"In the following diagram, a whirlwind gale passing off towards



the north-east and giving a westerly wind in the Malta channel is represented by the dotted circle. The other circle represents a new whirlwind gale coming from the south-westward, and giving an easterly breeze to a vessel to the southward of Malta.

General charts 165, 2158a, b, 449.

Chart 3670, Malta channel. Var. 8° W.

"If the circle which represents the new whirlwind gale coming from the south-westward, were to be placed more to the westward and over Algeria, it would give a south-west wind to such a vessel as that marked in the diagram.

"The wind in progressive revolving gales does not hold in the same quarter, but changes (except at their centres). The east wind in such a new gale coming from the south-west might be expected to change by the south towards west. A vessel under such circumstances would fall off her course and be carried towards the north. But she would be in a favourable position for taking advantage of the north-west wind, which is usually the concluding portion of revolving gales in the northern hemisphere."

Chart 165, Sardinia to Malta, including Sicily.

SICILY, the most important island in the Mediterranean, is separated from the mainland of Calabria by the narrow Strait of Messina, and forms a part of the kingdom of Italy. Its ancient name was Thrinacria, from its triangular form. The northern or longest side is about 150, the southern 140, and the eastern 100 miles in length. The western end is a rounded point, off which lie the Ægadean islands.

That portion of the Mediterranean which bounds the northern coasts of Sicily is named Mar Tirreno (Tyrrhenian sea), and that to the southward the Sicily and Malta channels.

Tides. — It is high water, full and change, at IIIh. 33m. at six different places on the south-east coast of Sicily with a mean range of one foot. Of the other places both the times and heights of tide are very irregular and vary considerably, the former as much as three or four hours from that given at the places hereafter mentioned; two causes apparently produce this variation. First, there appear to be two waves coming in different directions, with dissimilar fluctuations, sometimes giving two high waters instead of one, with a well-marked though slight depression and corresponding low-water between them, and these on different days are separated by unequal intervals.

Secondly, the wind blowing on or off shore alters the level of the surface of the water, producing what may be termed "wind fluctuations," varying with its strength and direction and the formation of the coastline; these fluctuations produce the observed difference in the times of high water. The variations in the range are as much as 15 inches. (For the tidal streams in the Strait of Messina, *see* page 590).

The Sicilian coasts are sometimes affected by a phenomenon named

Chart 165, Sardinia to Malta, including Sicily. Var. 8° W.

the mare-moto, which is the same in its effects at sea as the terra moto, or earthquake, is on shore; and appears to be owing to similar causes.

Plan 189, Trapani to Marsala, &c.

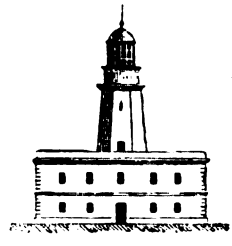
ÆGADEAN ISLES.—Off the west coast of Sicily, between Trapani and Marsala, are the islands formerly known as the Ægades or Ægates (the Insulæ Ægates of the ancients), consisting of Maritimo, Favignana, Levanzo, and the Formiche. They stand boldly out from the coast, and may be seen in clear weather at distances of from 40 to 60 miles.

MARITIMO (Marittimo) (ancient Hiera), the westernmost of the Ægades, is 4 miles in length in a north-north-west and south-south-east direction, and 1½ miles in breadth, its opposite sides are nearly parallel, and the extent of the coastline is about 12 miles. It is high and mountainous, ranging from 1,560 to 2,271 feet above the sea; nearly the whole of the western and north sides are high, steep, inaccessible cliffs, but the eastern side is lower. *See* view on plan 170.

Punta Troia, the north-east extremity, is a small but prominent peninsula, with a castle on it 370 feet above the sea; and midway on the east coast is the village of San Simone (Maretimo), north-north-eastward of which there is indifferent anchorage in 12 fathoms water, with the castle bearing 336° true, and the highest peak 292° true; fishing vessels find shelter in the small coves around the island.

The north side of the island is skirted with rocks, which are near the coast, but on the south-west side, at 4 cables to the south-east of the lighthouse, they extend 2 cables off. Punta Bassana, the south-east point, is a nearly isolated mass, 623 feet above the sea.

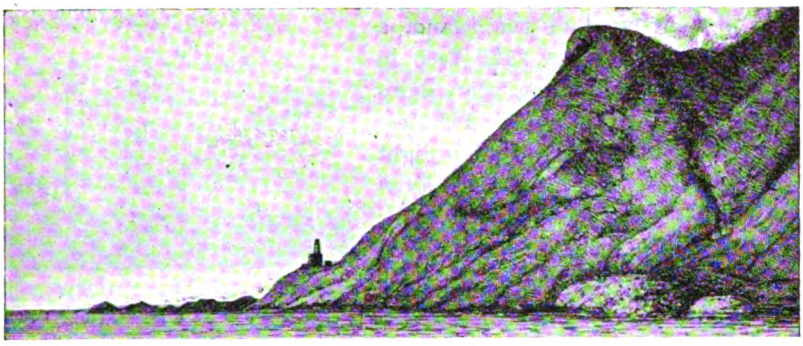
LIGHTS (*Lat. 37° 57′ N., Long. 12° 4′ E.*).—On the western side of Maritimo a rocky ridge projects about a quarter of a mile westward, named Punta Libeccio, and about 2 cables to the southward of it is a white octagonal tower, 80 feet in height, and surmounting a dwelling; it exhibits, at an elevation of 240 feet above the sea, a *fixed* and *flashing white* light *every two minutes*, thus:—fixed, *eighty-six and a half seconds;* partial eclipse, *fifteen seconds;* flash, *three and a half seconds;* partial eclipse, *fifteen seconds;* in clear weather it is visible from a distance of 22 miles. For arc of visibility, *see* Light list.



Punta Libeccio lighthouse.

General charts 170, 165, 1440, 2158a, b, 449.

Plan 189, Trapani to Marsala, &c. Var. 8° 30′ W.



Punta Libeccio. *Lighthouse, bearing 350° true.*

Maritimo.

A *fixed red* light is shown from the pier at San Simone on the east coast of the island; it is visible in clear weather from a distance of 4 miles, but cannot be lighted in bad weather.

A *fixed green* light is exhibited, at an elevation of 20 feet above the sea, on the slip near the village of San Simone.

Communication. — Weather permitting, a sailing vessel communicates three times weekly with Trapani, and there is telegraphic communication at limited hours.

Supplies.—A small quantity of fresh provisions may be obtained, and water of good quality.

Submarine telegraph cable. — A telegraph cable connects Maritimo with Favignana.

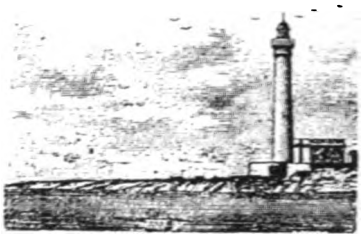
FAVIGNANA (*Lat. 37° 56′ N., Long. 12° 20′ E.*) (ancient Ægusa) is about 8¾ miles east-south-eastward of Maritimo, and its eastern side 3 miles north-west of Punta Scario, Sicily; it is about 5 miles in length in a north-west and south-east direction, and irregular in form, its breadth varying from about three-quarters of a mile to 2½ miles; the greater part is low, but a remarkable wall-like ridge runs north and south across the island, and on its summit is Forte Santa Caterina, 1,129 feet above the sea. *See* view on plan 170. The population of the island is 6,400.

The level land on either side of the ridge is fertile and well cultivated, and there are several quarries in the cliffs on its eastern side. The northern, western, and southern sides are skirted here and there by a narrow bank; but the north-eastern side is steep-to. *See* views, page 528.

General charts 170, 165, 1440, 2158a, b, 449.

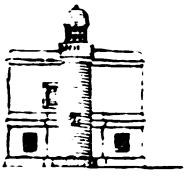
Plan 189, Trapani to Marsala, &c. Var. 8° 30′ W.

LIGHTS (*Lat. 37° 56′ N., Long. 12° 16′ E.*).—On Punta Sottile, the west extreme of the island, a white circular tower, 126 feet in height, with a dwelling near, exhibits, at an elevation of 141 feet above the sea, a *flashing white* light *every minute*, thus:—flash, *eleven seconds;* eclipse, *forty-nine seconds;* it is visible from a distance of 18 miles in clear weather.



Punta Sottile lighthouse.

A *flashing white* light *every ten seconds*, thus:—flash, *four seconds;* eclipse, *six seconds*, is shown, at an elevation of 61 feet above the sea, at Punta Marsala, the south-east extreme of the island, from a white circular tower, 39 feet in height, with a dwelling near it; in clear weather the light is visible from a distance of 10 miles.



Punta Marsala lighthouse.

Signal station. — Semaphore. — On Forte Santa Caterina, situated on the highest point of the island, is a semaphore, by which vessels can communicate. The apparatus is on a small tower painted in black and white squares, but the semaphore is sometimes hidden by clouds.

Plan of Favignana on 2113.

Cala Principale lies between Punta Faraglione and Punta San Nicolo, which are 2 miles apart on the north-east side of the island. It is the port of Favignana, and is about 1½ cables wide and 2 cables deep, with depths of from 2½ to 3½ fathoms between the entrance point, and shoaling to 3 feet near the head. There are two bollards, for securing vessels, on the southern part of the rock, situated half a cable northward of the pier.

Pier.—A small pier, about 150 yards in length, extends from the town on the east side of the port.

Light. — A *fixed* light, with *red* and *white* sectors, is exhibited from the pier end, at an elevation of 17 feet above the sea; in clear weather it is visible from a distance of 3 miles, but with strong northerly winds it cannot be lighted. For sectors, *see* Light list.

Anchorage. — Anchorage will be found off the town, with southerly and westerly winds, in 13 fathoms water, but exposed to

Plan of Favignana on 2113. Var. 8° 30′ W.

northerly winds, with the cupola of the church bearing 144° true, and the semaphore 216° true.

Town.—The town of Favignana (ancient Ægusa) lies on the eastern side of the port. There are large fisheries here for tunny and anchovy.

Communication.—Weekly steamers to Palermo, Tunis, Porto Empedocle and Syracuse, and fortnightly with Trapani; telegraphic communication with all parts.

Supplies.—Fresh provisions in moderate quantities may be procured; water only from cisterns.

Submarine telegraph cables.—Favignana is connected by telegraph cables with Sicily and Maritimo.

Plan 189, Trapani to Marsala, &c.

Tunny fishery.—The tunny fisheries would appear to have been worked for more than 400 years, according to a slab, recording a large catch taken so far back, and attached to the church door. During the fishing season, from March to November, nets extend from a point about three-quarters of a mile north-westward of Cala Principale, in a north-easterly direction for a distance of about 1¾ miles; and from Punta San Nicolo in an easterly direction for a distance of about 1½ miles. The outer end of the nets is marked with a boat painted with black and white stripes, and having a mast and flag by day, and showing a *white* light by night. *See* Caution, page 73, and on plan.

Anchorage (*Lat. 37° 55′ N., Long. 12° 23′ E.*).—The best anchorage is off the east end of the island, between Punta Rossa and Punta Marsala lighthouse, in 7½ or 8 fathoms water, over mud, about half a mile from the shore. From this anchorage to 2 miles farther north, the depths are from 9 to 19 fathoms, over sand or gravel, and towards Punta Scario (on the mainland) for 2 miles from 9 to 6 fathoms, where during westerly winds any number of vessels will find anchorage.

LEVANZO (*see* view on plan 170), ancient Phorbantia, lies more than 2 miles to the northward of Favignana, the channel between being deep and clear of danger. Levanzo is 2 miles in length north and south, a mile in breadth, and 887 feet above the sea; it is rugged, with steep inaccessible cliffs, the north-west and south-east ends excepted. Close to its south-west point is il Faraglione, a high conical rock, and near the south-east end a tower, and a few scattered houses; the soil is cultivated. The coast is clear of danger and generally steep-to.

General charts 170, 165, 1440, 2158a, b, 449.

Plan 189, Trapani to Marsala, &c. Var. 8° 20′ W.

LIGHT.—On Punta Grosso, the north extreme of the island, is a white circular tower, 39 feet in height, and having a dwelling near; it exhibits, at an elevation of 225 feet above the sea, a *fixed white* light, which is visible in clear weather, from a distance of 20 miles. For arc of visibility, *see* Light list.

Punta Grosso lighthouse.

Communication. — Weather permitting, a sailing vessel communicates twice every week with Trapani.

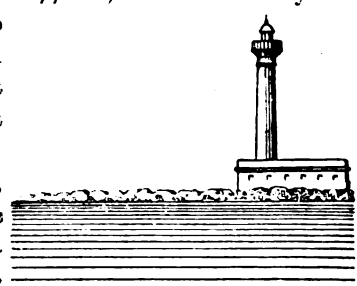
Supplies. — A small quantity of fresh provisions might be obtained; water is procured from cisterns.

Secca di Pesci is a sandbank lying 314° true, distant 5 miles from Punta Grosso lighthouse, on which the least water is 12 fathoms; within 2 miles northward of it is a depth of 100 fathoms, which depth in a tortuous line extends close to Capo San Vito.

Chart 170, Cefalù to Mazzara, &c.

SICILY.—WEST COAST.—Capo San Vito, the northwest extreme of Sicily, and the usual landfall to vessels from the westward, is a low point about 1½ miles long, lying at the foot of a rugged promontory on which is Monte Monaco, 2,296 feet above the sea. This promontory forms the termination of a lofty but narrow ridge, extending seaward from Monte Sparagio, 3,637 feet above the sea, and situated 8 miles to the southward of Capo San Vito. On the extremity of the cape is a white lighthouse, and on the shoulder of the first rise of land, Torre del Roccazzo, a square tower. *See* view on chart.

LIGHT (*Lat. 38° 11′ N., Long. 12° 44′ E.*). — About 173 yards from the extremity of Capo San Vito is a white circular tower, 125 feet in height, with a dwelling attached; it exhibits, at an elevation of 144 feet above the sea, an *alternating fixed* and *flashing* light *every minute*, thus:—*fixed white, thirty-four and a half seconds;* partial eclipse, *eleven and a half seconds; red flash, two and a half seconds;* partial eclipse, *eleven and a half seconds.* The *white* light is visible in clear weather from a distance of 18 miles, the *red* light 14 miles. An auxiliary *fixed red* light is exhibited below the



Capo San Vito lighthouse.

Chart 170, Cefalù to Mazzara, &c. Var. 8° 10′ W.

main light, and is visible from a distance of 2½ miles. For arcs of visibility, *see* Light list and chart.

Shoal.—A shoal, with 16 feet water over it, lies 8½ cables northward from the lighthouse, and depths of 3½ to 4½ fathoms between it and the cape, and in consequence of the abrupt rise of the bottom, the sea in heavy gales breaks on the shallow ground off the point, and is dangerous to small vessels. At 1½ miles from the lighthouse there are depths of more than 100 fathoms and large vessels should not round it within that distance. The auxiliary *fixed red* light on Capo San Vito shows over this shoal.

Baja di Vermia, between the shore of Capo San Vito, and Capo Cofano, is about 5 miles wide, and 2 miles deep. The water is everywhere deep, except on the south-east shore in front of the valley sloping from Monte Sparagio, where a vessel may anchor, with off-shore winds, within half a mile of the land. At 3 miles southward of Capo San Vito is a small cove and beach named Cala Isoletta.

Monte Cofano is a remarkable, steep, conical mountain, 2,127 feet above the sea, rising abruptly from the coast at the southwest extreme of Baja di Vermia. The point at its base is named Capo Cofano (Punta Barone), on which is the square tower of Agra, and a mile to the eastward is Vermia islet or rock.

Plan 189, Trapani to Marsala, &c.

Punta Pizzolungo (*Lat. 38° 4′ N., Long. 12° 34′ E.*) is low, and the termination of a spur from Monte San Giuliano. About half a mile within the point is a remarkable sugar-loaf hill, 234 feet above the sea, and conspicuous from the north-eastward.

Signal station. — On a hill near to Punta Pizzolungo is a semaphore station.

Secca Bonagia, a shoal nearly 1½ miles in length in an east-north-easterly and west-south-westerly direction, about 4 cables in breadth, with a least depth of 6 feet, fronts the rocky shore eastward of Punta Pizzolungo; at its eastern end it is a mile, and at its western half a mile from the shore, and the 10-fathom line is about the same distance outside it.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from the shore about half a mile eastward of Torre Bonagia, and extend north-westward for a distance of about 2½ miles. The outer end is marked by a floating beacon surmounted by a mast by day and a *white* light by night. *See* also Caution, page 73, and on plan.

General charts 165, 1440, 2158a, b, 449.

Plan 189, Trapani to Marsala, &c. Var. 8° 10′ W.

Isola Asinelli, a cable in circuit, and 6 feet above the sea, lies 1½ miles westward of Punta Pizzolungo, and there are from 10 to 17 fathoms between it and the coast.

Beacon.—A white iron beacon, 32 feet above the sea, and surmounted by a cylinder, on the north and south sides of which "Asinelli" is lettered in black, stands on Isola Asinelli.

Scoglio Asinelli beacon.

LIGHT.—From Asinelli beacon, at an elevation of 37 feet above the sea, is exhibited an unwatched *flashing red* light *every five seconds*, thus:—flash, *one second;* eclipse, *four seconds*. It is visible in clear weather from a distance of 7 miles.

Tunny fishery.—Tunny nets are laid out, during the season, March to November, from the shore about three-quarters of a mile south-westward of Punta Pizzolungo, and extend north-north-westward for a distance of about a mile. The outer end is marked by a floating beacon surmounted by a mast by day and a *white* light by night. *See also* Caution, page 73, and on plan.

Monte San Giuliano (*Lat. 38° 2′ N., Long. 12° 36′ E.*), the summit of which is about 2¼ miles south-south-eastward of Punta Pizzolungo, is a large, rugged, conical mass rising 2,464 feet above the sea, crowned by the town of the same name (ancient Eryx), which is surrounded by a dilapidated wall with square turrets, with the ruins of a Saracenic castle at its eastern angle; it has a population of about 29,800. In rounding Capo San Vito from the eastward, the town is conspicuous on the summit of the mount. *See* views, page 528.

Punta San Giuliano, a rocky projection on which is a tower, 50 feet high, and the buildings of a tunny factory, lies 2¼ miles south-westward of Punta Pizzolungo, the coast between being low and marshy, with a sandy beach.

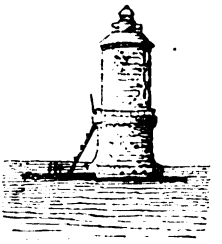
Tunny fishery.—Off Punta San Giuliano tunny nets are laid out during the season, March to November, and they extend in a north-westerly direction about a mile from the shore. The outer end is marked by a floating beacon, surmounted by a mast by day and a *white* light by night. *See* also Caution, page 73, and on plan.

Scoglio Porcelli, lying 4 $\frac{3}{10}$ miles westward from Punta San Giuliano, are a small dangerous group awash, with depths of from 7 to 8 fathoms close to them, and 15 fathoms at a distance of a cable.

General charts 170, 165, 1440, 2158a, b, 449.

Plan 189, Trapani to Marsala, &c. Var. 8° 10′ W.

LIGHT (*Lat. 38° 2′ N., Long. 12° 26′ E.*).—From a circular masonry tower, 79 feet high erected on these rocks, is exhibited a *white flashing* light *every five seconds*, thus:—flash, *two seconds;* eclipse, *three seconds.* It is exhibited at an elevation of 74 feet above the sea, and is visible in clear weather from a distance of 12 miles.



Scoglio Porcelli lighthouse.

Beacon.—In the middle of the shoal close to the lighthouse is an iron beacon, surmounted by a ball 28 feet above the sea.

Secca San Giovanni, a sandbank about 3½ cables in length in a northerly and southerly direction, with a least depth of 5½ fathoms, lies 1$\frac{1}{10}$ miles south-south-eastward of Scoglio Porcelli.

Formica and Maraone are two islets lying about 3¼ miles southward from Scoglio Porcelli; Maraone, the western islet, is long and narrow, with a building on it: the eastern is of irregular shape, with the buildings of a tunny factory and lighthouse on it. The islets are generally steep-to, and may be passed at a distance of a cable, but a shoal, with 3 fathoms over it, lies 2$\frac{7}{10}$ cables eastward of Formica.

LIGHT.—The lighthouse on Formica is a white circular turret, 65 feet in height over a fort, and exhibits, at an elevation of 85 feet above the sea, a *flashing white* light *every five seconds,* thus:—flash, *half a second;* eclipse, *four and a half seconds;* it is visible in clear weather from a distance of 8 miles. The light is named Formiche.

Formica (Formiche) lighthouse.

Tunny fishery.—Tunny nets are laid out during the season, March to November, about three-quarters of a mile in a north-north-westerly and nearly 1¾ miles in an east-north-easterly direction from Formica. The seaward limits of the nets are marked in daytime by boats painted black and white with mast and flag, and by night with a *white* light on the boats. *See* also Caution, page 73, and on plan.

Plan of Trapani harbour on 189.

Trapani approach.—About 1½ miles south-westward of Punta San Giuliano a low rocky tongue of land, Punta Ligni, extends nearly half a mile to the north-westward, the outer part being broken into rocks or islets; the inner end forms the northern part of Porto Trapani; 2 cables within the extreme of the point is Torre Ligni.

Isola del Lazaretto lies 2 cables south-westward of the inner end of Punta Ligni, with which it is connected by a causeway, and from the

Plan of Trapani harbour on 189. Var. 8° 20′ W.

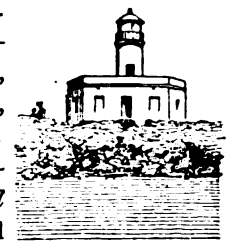
Lazaretto a cluster of low rocks and islands extends to the north-westward for a distance of 4 cables.

Secca Ballata lies 4¼ cables westward from Punta Ligni, and has 9 feet water on it.

A full quarter of a mile to the southward of Secca Ballata, and nearly the same distance from the north extreme of rocks south-west of Punta Ligni, is a rocky patch with 10 feet water on it, and another, with 13 feet, 1½ cables further south. The supplementary *fixed red* light on Scoglio Palumbo shows over Secca Ballata and these rocks.

Isola Colombaia, 2 cables to the southward of Isola del Lazaretto, has a fort and disused lighthouse at its eastern extreme; westward of the island are two other islets; the outer one, Palumbo, also has a lighthouse on it; they are surrounded by a flat, with depths of from one foot to 12 feet, and at nearly 2 cables to the north-east of Punta Ligni is Malconsiglio, 8 feet above the sea and steep-to.

LIGHTS (*Lat. 38° 1′ N., Long. 12° 30′ E.*). —On Scoglio Palumbo, 3½ cables west of Colombaia disused lighthouse, a white circular tower, 38 feet in height, and having a dwelling attached, exhibits, at an elevation of 55 feet above the sea, a *flashing white* light *every five seconds*, thus:—flash, *two-tenths of a second;* eclipse, *four and eight-tenths of a second.* The light shows all round the horizon except where obscured by the land, and is visible in clear weather from a distance of 12 miles.



Scoglio Palumbo lighthouse.

A supplementary *fixed red* light is exhibited from one of the windows of the lighthouse; it is visible in clear weather from a distance of 2 miles. For arc of visibility, *see* Light list and chart.

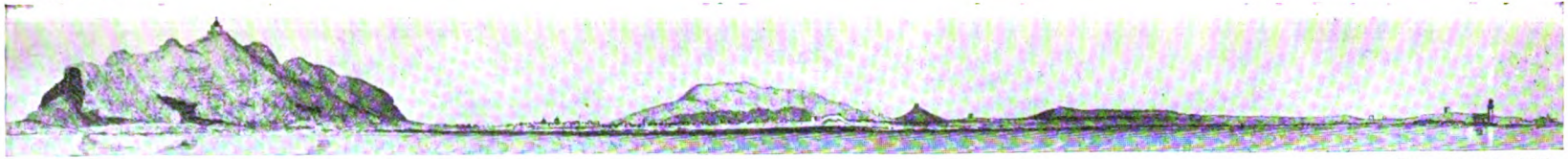
PORTO DI TRAPANI, formed on the south side of the town between Isola Colombaia and the shore, is open to the southward, and the harbour extends from Isola del Lazaretto for about 1¼ miles eastward, its breadth between the Salinas and the town being about 1¾ cables; but the north-western half is nearly dry, and it shoals rapidly 4 cables inside the inner breakwater. *See* view facing page.

Depths.—There are depths of 24 to 50 feet in the outer part of the harbour, 23 to 24 feet into the inner part of the harbour, and a space in the inner part, 3½ cables in length and one cable in width, has been dredged to a depth of from 21 to 25 feet.

Dredging operations are in progress.

General charts 170, 165, 1440, 2158a, b, 449.

To face page 528.]



Forte Santa Catarina.

Levanzo (distant).

Punta Marsala lighthouse bearing 30° true, distant 3½ miles.

Favignana.

Punta Sottile lighthouse, bearing 6° true, distant 2½ miles.

Levanzo (distant).

Favignana.

Forte Santa Catarina.

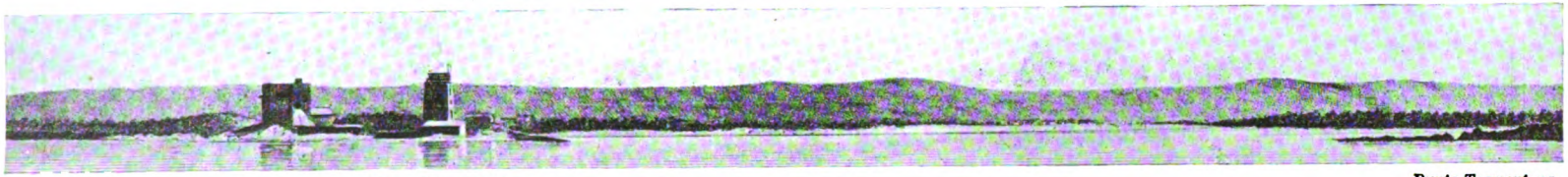
Monte San Giuliano (distant).

Scoglio Palumbo lighthouse.

Lazaretto. *Isola Colombaia lighthouse (disused), bearing 68° true.*

Trapani.

Monte San Giuliano.



Torre di San Teodoro (telegraph), bearing 111° true.

Punta Tramontana (Isola Grande).

Plan of Trapani harbour on 189. Var. 8° 20′ W.

Secca Mauda.—Buoys.—On the northern side of the entrance to the inner part of the port, about three-quarters of a cable north-westward of Punta Ronciglio breakwater lighthouse, is a shoal named Mauda; it is marked by two spar buoys, with white and black horizontal bands, one at each end of the shoal.

Breakwaters.—A breakwater to protect the port from the westward and south-westward extends for $1\frac{4}{10}$ cables southward from the south-east angle of the fort on Isola Colombaia. A breakwater about a cable in length extends in a north-westerly direction from Punta Ronciglio, on the south side of the harbour, and on the north side a short mole, has a southerly direction from near the Custom-house.

LIGHTS (*Lat. 38° 1′ N., Long. 12° 30′ E.*). — On the extremity of the breakwater at Punta Ronciglio, from an iron crane, is exhibited, at an elevation of 33 feet above the sea, a *flashing green* light *every three seconds*, showing thus:—flash, *half a second;* eclipse, *two and a half seconds;* it is visible in clear weather from a distance of 9 miles.

On the outer end of the breakwater, extending from Isola Colombaia, is exhibited, at an elevation of 31 feet above the sea, from a grey iron structure, an *occulting red* light *every five seconds*, thus:—light, *three and a half seconds;* eclipse, *one and a half seconds.* It is visible in clear weather from a distance of 6 miles.

On the extremity of the mole, near the Custom-house, a *fixed red* light is exhibited, at an elevation of 16 feet above the sea, from an iron standard 13 feet in height standing on a stone base; it is visible in clear weather from a distance of 3 miles, and shows over the port.

Mooring buoys.—There are three mooring buoys in the outer part of the harbour; they lie in a south-westerly direction from Ronciglio breakwater lighthouse, the outer being half a mile distant from it; they are for the use of the Italian mail steamers.

Pilots. — There are seven pilots for the port, but pilotage is not compulsory either for entering or leaving.

The rates of pilotage are as follows:—

For vessels which, on arriving, are piloted to the roads, or which, leaving the roads, employ a pilot, 8 centesimi a ton, with a minimum of 20 lire and a maximum of 80 lire.

For vessels which, arriving, are piloted to the port, or which, leaving the port, employ a pilot, 12 centesimi a ton, with a minimum of 30 lire and a maximum of 120 lire.

General charts 170, 165, 1440, 2158a, b, 449.

Plan of Trapani harbour on 189. Var. 8° 20′ W.

For vessels which, anchored in the roads, are piloted into port, and vice-versâ, 8 centesimi a ton, with a minimum of 20 lire and a maximum of 80 lire.

Vessels which employ a pilot when entering the roads or port, and when in the passage from the roads to the port, employ one on leaving and returning to the roads, will pay only a half of the above dues.

Anchorages (*Lat. 38° 0′ N., Long. 12° 30′ E.*). — The outer anchorage is about 2½ cables southward of Colombaia lighthouse, in 8 or 10 fathoms water, over mud and weeds. There is also good anchorage, with S.W. and southerly winds, in the bay north of the town, in depths of 7 or 8 fathoms over sand.

Charts 170 and 189.

Directions. — Vessels from the northward bound to Trapani, after rounding the promontory of Capo San Vito, should steer about 232° true for 10 miles, when Scoglio Porcelli lighthouse will be seen, and then Isola Asenelli beacon and Formica lighthouse. Bring Formica lighthouse to bear 213° true just westward of the east end of Favignana, and steer for it, which will lead nearly midway between Scoglio Porcelli and Secca Ballata, until Palumbo light bears 126° true, and is in line with Paceco Green peak (Monte Castellazo), 413 feet above the sea, situated to the south-east of the town of Paceco: then steer more to the southward, and gradually haul in for the anchorage.

From Trapani, bound to the southward, steer about 242° true for the peak of Favignana, to avoid the shoal ground extending 1¼ miles seaward north-west of Torre Nubia, until the south point of Levanzo is open southward of Formica, bearing 270° true; then steer 212° true, passing about midway between the lighthouse of Punta Marsala at the south-east end of Favignana, and the light-buoy north-westward of Punta Scario.

At night, vessels from the northward, after rounding Capo San Vito should steer for Scoglio Porcelli, and when the light, *white flashing*, is sighted (Isola Asinelli light, *red flashing*, will be sighted about the same time), keep it bearing 233° true until Formica light, *white flashing*, is sighted, which light should be kept bearing 216° true until through the *red* sector of Palumbo supplementary light, when the anchorage may be steered for.

CAUTION.—During the tunny season the channels eastward of Scoglio Porcelli, Levanzo, and Favignana are so much obstructed by tunny nets that it is advisable to pass westward of them.

General charts 165, 1440, 2158a, b, 449.

Plan of Trapani harbour on 189. Var. 8° 20′ W.

Town (*Lat. 38° 1′ N., Long. 12° 30′ E.*).—The town of Trapani (ancient Drepanum) stands on a low tongue of land curving to the north-north-westward in the form of a scythe; it contained a population in 1911 of 59,375, is well built, with regular streets, and has a cathedral, many churches, convents, nunneries, hospitals, and other public buildings, and is entirely surrounded by a wall, with bastions, ravelins, &c. A British Vice-Consul is resident. A fine marina extends along in front of the southern wall.

Communication.—Steamers leave every week for Marsala, Tunis, Bizerta, Palermo, and Cagliari, and fortnightly for Pantellaria, also frequent communication with Europe; railway communication with Marsala, and telegraphic communication with all lines. The telegraph office is open till midnight.

Coal and supplies.—About 2,000 tons of coal are usually kept in stock, coaling is carried on by baskets, and about 200 tons could be put on board in 24 hours; there are about 50 lighters, each holding 20 tons. S.E. and N.W. winds might impede or prevent coaling.

Supplies of fresh provisions are abundant, and very good water, which is conveyed into the town by an aqueduct, may be obtained by means of a municipal tank boat.

Trade.—Trapani has a considerable trade, and the salinas, just to the south-east of the town, are the most extensive of any in Sicily, the salt being of good quality and largely exported. The inhabitants carry on the coral fishery on the African coast, the cutting and polishing of coral being a branch of industry. Besides salt and coral, the exports comprise wine, macaroni, and corn flour, and imports staves, deals, planks, chemical fertilisers, charcoal, and coals, of which latter 29,704 tons were imported in 1911.

Shipping.—In 1911, 76 steam vessels, with a total tonnage of 83,421 tons, entered the port, and 25 sailing vessels with a total tonnage of 12,891 tons.

Hospital.—The Civil hospital has 250 beds, 50 of which are available for a fixed rate of payment.

Chart 189, Trapani to Marsala, &c.

Coast.—To the southward of Trapani, the coast land is flat, and so low as to be flooded by the sea. It is formed into extensive salterns, the squares being separated by raised causeways. The salt, when collected and heaped into pyramids ready for shipment, presents from seaward the appearance of a large camp, behind which the richly cultivated land gradually rises to the small towns of Xitta and Paceco, which are backed by a range of hills 721 feet above the sea.

General charts 170, 165, 1440, 2158a, b, 449.

Plan 189, Trapani to Marsala, &c. Var. 8° 20′ W.

About 2 miles southward of Trapani is Torre Nubia, 46 feet in height, square, white, and isolated, and off the low point a small, sandy islet with shoal water extending off some distance, there being only 5 fathoms at $1\frac{1}{2}$ miles north-west of the tower. The shoal affords some protection to the anchorage of Trapani.

From Torre Nubia, the low coast, with houses close to the sea, trends in a southerly direction for $4\frac{2}{3}$ miles to a point on which is Torre di San Teodoro (telegraph), painted black and white in squares, and two mills (*see* view, page 528); nearly midway between is Torre Mezzo. The country is richly cultivated with olive groves and vineyards, and backed by a ridge from 320 to 400 feet above the sea.

Secca del Fiume, a detached bank with $4\frac{3}{4}$ fathoms over it, lies 2 miles west-south-westward of Torre Mezzo, and the 5-fathom line extends nearly $1\frac{1}{4}$ miles from the shore in this neighbourhood.

Isola Grande.—About 3 cables south-westward of Torre di San Teodoro is Punta Tramontana, the northern extreme of a low island, named Isola Grande, which extends southward for a distance of $3\frac{2}{3}$ miles, its surface being formed into salterns; a tower stands midway between its extremes, and there are several mills; between it and the mainland is a shallow lagoon, locally known as Stagnone, in which are two smaller islands and several rocks.

From Punta Scario, the north-west extreme of Isola Grande, shallow water extends in the same direction $1\frac{1}{4}$ miles, and in rounding the point a vessel should not approach into less than 6 fathoms water. Anchorage will be found with southerly winds off the bend of the shore north of the island, avoiding the telegraph cable which crosses to Favignana.

Light-buoy (*Lat. 37° 54′ N., Long. 12° 25′ E.*).—On the north-western edge of the shoal extending from Punta Scario a cylindrical light-buoy, with black and white horizontal stripes, surmounted by a staff, has been established, exhibiting a *flashing red* light *every five seconds*, thus:—flash, *half a second;* eclipse, *four and a half seconds.*

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore about half a mile eastward of Punta Scario; they extend about $1\frac{3}{10}$ miles in a north-westerly direction. The outer end is marked by a pole by day and a *white* light by night. *See* also Caution, page 73.

Capo Lilibeo, about $5\frac{1}{2}$ miles southward of Punta Scario, is low, sloping, and foul; the shore between, being bordered by shallow water, at distances varying from one to $2\frac{1}{2}$ miles, should not be approached nearer than 6 or 7 fathoms.

General charts 170, 165, 1440, 2158a, b, 449.

No. 805.—PORT OF MARSALA—LIGHT ESTABLISHED.

Position.—On the extremity of the outer arm of the West Mole, which has recently been completed.

Lat. 37° 47′ N., long. 12° 26′ E.

Details:

Character.—A *flashing red* light *every three seconds*, thus:—

$$\frac{\text{Flash,}}{\frac{3}{10}\text{ sec.}} \quad \frac{\text{eclipse.}}{2\frac{7}{10}\text{ secs.}}$$

Elevation.—Not stated.

Visibility.—5 miles.

Structure.—Framework on masonry hut.

Remarks.—The light-buoy with red light formerly marking the outer end of the mole, has been withdrawn, and the note relating to it, also "Light building" shown on some copies of the charts is to be expunged.

Chart No. 2113. Med. 1, p. 533.

No. 187.—MARSALA—ALTERATION IN CHARACTER OF LIGHTS.

1. **Marsala light:**

Position.—On the end of the West mole.

Lat. 37° 47¼′ N., long. 12° 26¼′ E.

Details.—The fixed and group flashing white light has been replaced by a *group flashing white* light, showing *two* flashes *every twenty seconds*, thus:—

Flash,	eclipse,	flash,	eclipse.
1 sec.	4 secs.	1 sec.	14 secs.

Remarks.—The light has a visibility of 13 miles.

2. **East mole light:**

Position.—On the end of the East mole.

Details.—The occulting green light has been replaced by a *flashing green* light *every three seconds*, thus:—

Flash,	eclipse.
$\frac{3}{10}$ sec.	$2\frac{7}{10}$ secs.

Remarks.—The light will be unwatched.

Chart No. 2113.

Med. 1, p. 533.

No. 167.—Marsala.—Alternation in Characters of Lights.

1. Marsala light:

Position.—On the end of the West mole.

Lat. 37° 47½′ N., long. 12° 26½′ E.

Details.—The fixed and group flashing white light has been replaced by a group flashing white light, showing two flashes every twenty seconds, thus:—

Flash.	eclipse.	flash.	eclipse.
1 sec.	4 secs.	1 sec.	14 secs.

Remarks.—The light has a visibility of 13 miles.

2. East mole light:

Position.—On the end of the East mole.

Details.—The occulting green light has been replaced by a flashing green light every three seconds, thus:—

Flash.	eclipse.
$\frac{8}{10}$ sec.	$2\frac{2}{10}$ secs.

Remarks.—The light will be unwatched.

Chart No. 2112. Med. 1, p. 533.

Plan of Marsala on 2113.

PORTO DI MARSALA is an artificial port about one mile south-westward of Capo Lilibeo.

A conspicuous mill, 1¼ miles east of the cape, is 108 feet above the sea, and along the shore immediately southward of the town are three wine establishments, appearing like large barracks, and conspicuous from seaward.

The port is shallow and the entrance narrow, so vessels should not enter without local assistance.

Depths.—There are depths of 12 to 15 feet a little within the entrance; vessels drawing 14 feet can enter; the western mole has depths of 4 to 9 feet alongside; the eastern mole is not in a condition for vessels to load or discharge alongside. A 20-foot channel into the harbour is being dredged.

Moles.—The west mole, extending in a south-west direction from the Custom-house, curves gradually round to south-east, and is about 1,150 yards in length; at 200 yards from its extreme a mole extends 440 yards in a southerly direction, and is being lengthened for another 175 yards in the same direction. The work is to be completed by July, 1915.

The work in progress is marked by a pillar 3 feet high, and by a buoy exhibiting a *fixed red* light.

The east mole, 6½ cables south-eastward of the commencement of the west mole, has an easterly direction curving slightly to the northward, and is 500 yards in length, leaving an entrance between the mole-heads, about a cable in width, with depths of from 1¼ to 3 fathoms.

LIGHTS (*Lat. 37° 47′ N., Long. 12° 26′ E.*).—On the extremity of the west mole, a circular tower, 59 feet in height, exhibits, at an elevation of 65 feet above the level of the sea, a *fixed* and *group flashing white* light *every twenty seconds*, showing thus:—fixed, *thirteen and a half seconds;* flash, *one and a half seconds;* partial eclipse, *three and a half seconds;* flash, *one and a half seconds;* it is visible in clear weather from a distance of 14 miles.

At 10 yards eastward of the preceding a *fixed red* light is shown, at an elevation of 21 feet above the sea, from an iron structure; this light is only provisional, and is obscured over the works in progress on the mole. For arc of visibility, *see* Light list and chart.

At the end of the east mole an *occulting green* light *every ten seconds*, thus:—light, *seven seconds;* eclipse, *three seconds*, is shown from an iron crane on a small masonry building, and is elevated 31 feet above the sea, being visible in clear weather from a distance of 5 miles.

General charts 189, 170, 165, 1440, 2158a, b, 449.

Plan of Marsala on 2113. Var. 8° 20′ W.

Light-buoy. — A buoy exhibiting a *fixed red* light is moored about 140 yards southward of the West mole extension works.

Buoys. — A red cylindrical buoy for the use of floating craft at work on the mole extension is moored about 70 yards from the head of the outer west mole.

A mooring buoy lies in 4½ fathoms about one cable eastward of the mole extension.

Pilots.—The rate of pilotage, both for steam and sailing vessels, is 8 centesimi for every ton of net measurement, but with a minimum of 20 lire and a maximum of 80 lire.

Pilots are obliged, when requested, to meet vessels arriving up to 2 miles from the entrance of the port, and to conduct those leaving one mile from the entrance, subject to weather permitting.

When the captain, moving his vessel, requests the assistance of the pilot boat, this is not refused, but for such work the pilots are entitled to a payment of 20 lire.

Town (*Lat. 37° 47′ N., Long. 12° 26′ E.*).—The town of Marsala (ancient Lilybæum), long the capital of the Carthaginian dominions in Sicily, has, like Trapani, several churches and convents, and a cathedral dedicated to St. Thomas à Becket; it is situated northward of the port, is built in a square form, and surrounded by a wall in ruins.

The population in 1911 of the town and district was 69,410, and a British Vice-Consul is resident.

Communication. — Steamers every week to Palermo, Trapani, Genoa, Pantellaria, Syracuse, Porto Empedocle, and Tunis, and every fortnight to Lampedusa, also steamers frequently to England and Malta. Railway communication with Trapani, Mazzara, and Palermo; telegraphic communication with all lines. The telegraph office at the railway station is open till midnight.

Coal and supplies.—There is no coal, patent fuel, or oil fuel, at Marsala. Meat is not very plentiful, but bread and vegetables are. Spring water may be obtained from a public fountain near the wharf.

Trade. — The principal trade is in wine, most of which is sent to Great Britain or her colonies; cheese, salt, macaroni, olive oil, cereals, and green fruit are also exported; the imports are chiefly petroleum, staves, coffee, sugar, and wood for building. In 1911 the exports were valued at £97,042 and imports at £23,438.

Shipping. — In 1911, 503 steam vessels, with a total tonnage of 352,885 tons entered the port, and 1,183 sailing vessels, with a total tonnage of 26,417 tons.

Hospital.—The civil hospital has 30 beds.

General charts 189, 170, 165, 1440, 2158a, b, 449.

Plan 189, Trapani to Marsala, &c. Var. 8° 30′ W.

Anchorage.—There is good anchorage, except in winter months, about three-quarters of a mile south-westward from the lighthouse on the west mole, with the southern wine establishment (Ingham's) bearing 65° true.

Punta Sibiliana. — From Marsala the coast trends southward 5 miles to Punta Sibiliana, on which is a tower. The land between is richly cultivated and the coast low, bordered with shallow water, the 5-fathoms line of soundings being, in places, nearly a mile offshore.

Chart 186, Mazzara to Palma.

SICILY.—South-west coast.—Punta Bushini, a mile southward of Punta Sibiliana, is low and surrounded by rocks, with two or three small houses on the land forming the bay on its north side; thence, to Punta della Matica, 3¾ miles south-eastward, the coast is low and skirted with rocks. Punta della Matica (Capo Feto) is surrounded by shallow water, there being a depth of 4 fathoms three-quarters of a mile from the shore, and vessels should not approach the point within a depth of 10 fathoms. In proceeding to the southward and eastward, the light at the town of Marsala should not be brought to bear westward of 3° true until Capo Granitola light bears 123° true.

At Punta della Matica a sandy beach extends eastward and southward, forming an inward bend, and terminating at the town of Mazzara, 3½ miles from the point; the low shore is bordered all along by shallow water. The *red* sector of Mazzara light shows over the shoal water off Punta della Matica.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from the shore of Punta della Matica; they extend in a south-south-westerly direction for over a mile; the outer end is marked with a white pole by day, and a *white* light by night. *See* Caution, page 73.

MAZZARA (ancient Emporium or Massara) (*Lat. 37° 39′ N., Long. 12° 35′ E.*) is surrounded by an old wall of Saracenic construction, flanked by small square towers, and has an old castle in ruins at its south-west angle. The domes of the churches give the town an imposing aspect from the sea, and another conspicuous object is the white statue to San Vito at the entrance to the River Salemi (Torrente Mazzaro). The population numbers about 20,000. A British Vice-Consul is resident at Mazzara.

Porto Canale, formed by the estuary of Torrente Mazzaro, runs in about half a mile westward of the town; it is about 70 yards wide for the first 100 yards, and then contracts to about 30 yards. The

Chart 186, Mazzara to Palma. Var. 8° 20′ W.

outer part is kept dredged to a depth of 9 feet, and affords shelter to small vessels, but a pilot is necessary to take a vessel in.

LIGHTS (*Lat. 37° 39′ N., Long. 12° 35′ E.*).—A red iron framework support, 7 feet high, and situated on the small pier on the eastern side of the entrance to the Porto Canale, exhibits, at an elevation of 33 feet above the sea, a *white occulting* light, with *red* sector, *every fifteen seconds*, thus:—light, *ten seconds;* eclipse, *five seconds;* it is visible in clear weather from a distance of 10 miles. For sector and arc of visibility, *see* Light list and chart.

Two *fixed red* electric lights mark the entrance to Porto Canale.

Beacon.—On Secca Balata, a shoal lying about half a cable to the westward of the small pier at the entrance, is a black beacon consisting of a masonry base surmounted by an iron framework, with cylinder; it should be left on the port hand when entering.

Mooring buoy. — A red cylindrical mooring buoy lies about 3 cables south-westward of the entrance to Porto Canale.

Anchorage. — There is anchorage, in 6 to 7 fathoms, off Porto Canale, with the statue of San Vito bearing about 56° true. The bottom is generally sand and weed, but the nature should be ascertained before anchoring, as there are patches of rock.

Communication. — Steamers every week to Palermo, and to Syracuse, calling at the ports on the south coast of the island. Railway communication with Palermo and Trapani at San Nicola, about 2 miles inland; telegraphic communication with all parts. The telegraph office is open till 9 p.m.

Hospital.—There is a civil hospital with 16 beds.

Supplies of fresh provisions may be procured, and water of good quality.

Trade.—The principal exports to Great Britain and colonies are wine, cheese, and olive oil, and the imports from the same are rice and wine.

Submarine telegraph cable. — A telegraph cable to Pantellaria is landed on the north side of the entrance to Fiume Arena, a river 1½ miles south-eastward of Mazzara: its direction is marked by two beacons.

The beacons marking the first direction of the cable are posts, each surmounted by a white framework globe, one of the globes having the letter T in black on it. There is also a board, with a notice that anchorage, &c., is prohibited near the cable.

Il Marobbio.—It is not prudent to anchor too near the town, on account of Il Marobbio, an extraordinary phenomenon, most probably

Chart 186, Mazzara to Palma. Var. 8° 20′ W.

deriving its name from Mare Ubbriaco, or Drunken sea, being a violent agitation of the water, occurring principally on the southern coast of Sicily, and, though generally found to happen in calm weather, is considered the certain precursor of a gale.

Il Marobbio is felt with the greatest violence at Mazzara, perhaps owing to the contour of the coast. Its approach is announced by a stillness in the atmosphere and a lurid sky: when suddenly the water rises nearly 2 feet above its usual level, and rushes into the creeks with amazing rapidity; but in a few minutes recedes with equal velocity, disturbing the mud, tearing up the seaweed, and occasioning a noisome effluvia; during its continuance the fish float helpless on the turbid surface, and are easily taken.*

These rapid changes generally continue from thirty minutes to upwards of two hours, and are succeeded by a breeze from the southward, which quickly increases to heavy gusts. This phenomenon may be occasioned by a westerly wind, blowing at some distance in the offing towards the north coast of Sicily, and a south-east wind at the same time in the channel of Malta, the meeting of which would take place between Trapani and Capo St. Marco; for the westerly wind most usually precedes, and the south-east succeeds il Marobbio.

SOUTH COAST.—Capo Granitola.—At 1½ miles from Mazzara the Fiume Arena runs into the sea, and between it and the cape is Lago Preola. Cape Granitola is a low, broad projection, and about three-quarters of a mile to the northward of it is the old lighthouse of Sorello, and a white cylindrical tower near it: the coast in its vicinity is skirted with rocks. *See* view, page 542.

LIGHT (*Lat. 37° 34′ N., Long. 12° 40′ E.*).—On Capo Granitola a white circular tower, 110 feet in height, with a dwelling attached, exhibits, at an elevation of 123 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 19 miles.

Capo Granitola lighthouse.

Punta Atriversa, about three-quarters of a mile to the south-east of the cape, is low, and skirted with rocks, the shallow water extending off about 6 cables. All the adjacent land is flat and low, cannot be seen in thick weather, and should not be approached within the depth of 10 fathoms.

Current.—Off Capo Granitola and along the south coast of Sicily the current generally sets to the south-east, increasing in strength with north-west winds; while south-west winds,

* Memoir of Sicily, by Captain W. H. Smyth, R.N., 1824.

General charts 165, 1440, 2158a, b, 449.

Chart 186, Mazzara to Palma. Var. 8° 10′ W.

which are sensibly felt during the vernal equinox, cause a strong counter current. At times, however, the currents are irregular, and no dependence can be placed on them; but their strength and direction generally depend on that of the wind.

Coast.—From Punta Atriversa a long line of beach stretches in an easterly direction for 7 miles to another point named Polusia, composed of small cliffs and about 80 feet high. Torre Tre Fontane stands close to the sea 2½ miles from Punta Atriversa, and near it is a good stream of fresh water; upon the rising ground north-eastward of Torre Tre Fontane are the towns of Campobell and Castelvetrano, the latter 660 feet above the sea.

A shallow bank, close to the beach, breaks the sea and affords shelter to the fishing boats during southerly winds; the boats are hauled on the beach at night.

Selinunte (*Lat. 37° 35′ N., Long. 12° 51′ E.*).—On the plain over the cliffs, about three-quarters of a mile eastward of Punta Polusia, are the ruins of Selynus, or Selinuntum, which, at a little distance seaward, resembles a large town; two enormous pillars, like towers, are still standing. There are also a few houses and a coastguard station. On each side of the cliffs is a small river, the western named Modione, and the eastern Belice; they are about 2 miles apart, with a tower on the cliff near the former.

Near the coast the land is covered with dwarf palms, wild olives, and myrtles, and abounds with game, and the interior is richly cultivated with vineyards.

Porto Palo, about 3 miles eastward of the ruins of Selinunte, is formed by a small, bluff, cliffy point named Capo Scaro, has from 3 to 4 fathoms water, over muddy sand, and is much to be recommended as a port of shelter to small vessels, from north-westerly winds. The point is rocky and surrounded with shallow water; there is a village on it, and a square tower 136 feet above the sea.

Here is a large fishery for anchovies and sardines and the town of Menfi, of which Palo is the port, is 3 miles to the north-east, connected by a broad road through a fertile grain district, and exports a large quantity of grain. Porto Palo is difficult to distinguish when making it from the southward; the tower on the point is, however, a good guide.

Communication.—The nearest railway is Castelvetrano on the Trapani-Palermo line; there is a good road from Porto Palo to Menfi, and thence to Castelvetrano.

Telegraph station.—There is a telegraph station on Capo Scaro.

General charts 165, 1440, 2158a, b, 449.

No. 663.—Cape San Marco Light—Alteration in Character.

Position.—Lat. 37° 29½′ N., long. 13° 01¼′ E.

Alteration.—The character of the light has been altered from fixed and flashing white every thirty seconds to *group flashing white*, showing *three* flashes *every twenty seconds*, thus:—

Flash,	eclipse,	flash,	eclipse,	flash,	eclipse.
1 sec.	2 secs.	1 sec.	2 secs.	1 sec.	13 secs.

Remarks.—The correct visibility of the light is 15 miles.

Chart No. 2113. Med. 1, p. 539.

No. 659.—Cape San Marco Light.—Alteration in Character.

Position.—Lat. 37° 293′ N., long. 12° 01′ E.

Alteration.—The character of the light has been altered from fixed and flashing white every thirty seconds to group flashing, showing three flashes every twenty seconds, as follows:—

Flash.	eclipse.	flash.	eclipse.	flash.	eclipse.
1 sec.	2 secs.	1 sec.	2 secs.	1 sec.	15 secs.

Remarks.—The correct visibility of the light is 13 miles.

Chart No. 2113.

Med. 1, p. 539.

Chart 186, Mazzara to Palma. Var. 8° W.

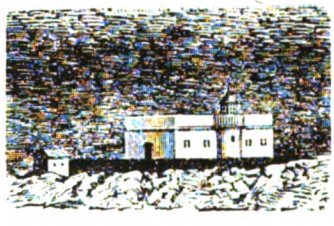
Supplies.—Fresh provisions in small quantities may be obtained; the water is good and abundant.

Coast. — From Porto Palo to Capo San Marco, a distance of 7 miles, the coast is low and sandy, and between is the Fiume Carabi. The coast between Punta Atriversa, 17 miles west-north-west, and this cape forms a bay more than 3 miles deep, which is clear of danger; the shore may be approached to the distance of a mile, in depths of from 10 to 15 fathoms, over mud and sand.

Plan of Sciacca on 2113.

Capo San Marco is an abrupt, irregular point of reddish colour, with a cylindrical white tower fronted by a house on it, elevated 310 feet above the sea; it is skirted with rocks, the depths near it are irregular, and there is a patch of $4\frac{3}{4}$ fathoms about three-quarters of a mile southward of it.

LIGHT (*Lat. 37° 30′ N., Long. 13° 1′ E.*).—On Capo San Marco, a white octagonal turret, 21 feet in height, and surmounting a dwelling, exhibits, at an elevation of 100 feet above the sea, a *fixed* and *flashing white* light *every thirty seconds*, thus:—fixed, *seventeen seconds;* partial eclipse, *five seconds;* flash, *three seconds;* partial eclipse, *five seconds;* it is visible in clear weather from a distance of 15 miles. For arc of visibility, *see* Light list and chart.



Capo San Marco lighthouse.

SCIACCA.—Between Capo San Marco and Capo Bianco, about 14 miles to the south-eastward, the coast forms another extensive bay similar to that north-west of the former cape. The town of Sciacca (ancient Thermæ Selinuntiæ), about 3 miles from Capo San Marco, stands on the declivity of an eminence rising from the sea, and is surrounded by an irregular wall, with bastions towards the sea, and a castle at its eastern angle.

The monastery on Monte San Calogero, elevated 1,270 feet above the sea, lies $1\frac{1}{2}$ miles north-eastward of the town. *See* view on Chart 186.

The appearance of the town from a distance, notwithstanding its large churches, convents, and magazines, is more imposing than when in close proximity. It is one of the principal ports on the south coast of Sicily for the exportation of corn, and the rock on which the town stands is, in numerous places, hollowed out into corn cellars. The long esteemed baths of Sciacca are supplied from two springs without

Plan of Sciacca on 2113. Var. 8° W.

the town to the eastward. The water issues from a white saline rock in two distinct streams, one of which is sulphurous and hot, at about 126° Fahrenheit; the other cool, at about 60° Fahrenheit, impregnated with the saline quality of the rock, and highly valued for cutaneous disorders. But the steam baths, the construction of which was ascribed in antiquity, to Dædalus, and now called the Stufe di San Calogero, are on the summit of the hill about 1½ miles N.E. of the town, and are said to have been in use more than 3,000 years ago. The population is about 24,640.

Mole. — A mole, 320 yards in length, in a westerly direction, extends parallel to the shore in front of the town, and encloses a space from a half to three-quarters of a cable in width, with depths of about 4 feet.

Light (*Lat. 37° 30′ N., Long. 13° 5′ E.*).—On the end of the mole, from an iron standard, 19 feet high, at an elevation of 23 feet above the sea, is exhibited an *occulting green* light *every seven and a half seconds*, thus:—light, *five seconds;* eclipse, *two and a half seconds;* it is visible in clear weather from a distance of 5 miles.

Mooring buoy.—There is a mooring buoy about 2½ cables south-south-westward of the lighthouse, in 8 fathoms water.

Anchorage. — Vessels, in summer, anchor with the mole lighthouse bearing 59° true, distant about half a mile in 8 fathoms water, over sand, but being exposed to all winds from south-east, round south to west, it is not resorted to in winter.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from the shore, about 1½ miles westward of the molehead; they extend in a southerly direction for about 1½ miles. The outer end of the net is marked by two small white balls surmounted by branches, by day, and by night by a boat showing two vertical lights, upper *white*, lower *red*. *See* also Caution, page 73.

Communication.—Weekly steamers to Palermo and Syracuse; the nearest railway station is at Castelvetrano, which may be reached by road through Menfi; a railway is being constructed up this coast from Porto Empedocle to Castelvetrano; telegraphic communication with all lines. The telegraph office is open till 9 p.m.

Supplies of fresh provisions are plentiful; water of medium quality may be obtained, free of charge, from two hydrants near the root of the mole. The keys are kept at the Custom-house.

Hospitals.—There are two hospitals, which receive seamen for treatment.

Trade.—There is not much commerce; the exports consist principally of corn, wine, paste, oil, and salt fish.

General charts 186, 165, 1440, 2158a, b, 449.

Chart 186, Mazzara to Palma. Var. 8° W.

Coast.—About 5 miles eastward of Sciacca is Torre della Verdura, which is square, with battlements, and elevated 300 feet above the sea; about a mile farther, and more to the southward, is a considerable stream, Fiume San Carlo della Verdura, with an outlet on the east side of Punta Stingo. The soundings are irregular for about a mile off, and a shallow fronts the shore upon both sides of Punta Stingo; 6½ miles to the northward is the remarkable knob, 3,064 feet above the sea, on Monte Caltabellotta. *See* view on chart.

Capo Bianco (*Lat. 37° 22′ N., Long. 13° 17′ E.*) is a white promontory, about 90 feet high, sloping from an elevation of 450 feet above the sea, with shallow water extending upon either side for more than half a mile from the beach. Between the cape and Sciacca the country presents an extensive undulating, and well-cultivated plain, watered by several rivers, in some of which is good fishing; the largest are Magazzolo and Platani, which flow upon both sides of Monte Sara, which is dark and elevated 1,421 feet above the sea. (*See* view on chart.) The plain is backed by high rugged land, and there are sulphur mines situated about 2 miles inland from the cape.

Coast. — Between Capos Bianco and Rossello, a distance of 10 miles, the coast is broken by several rocky cliffs and headlands, elevated from 300 to 500 feet above the sea. Three miles from the former cape is Torre Salsa on a point, and 6 miles beyond Torre Monterosso on another point; between these is Fiume Canna.

This part of the coast is foul, as shoals, with from 6 to 18 feet water over them, extend from half a mile to one mile from the shore; a quarter of a mile outside Punta Salsa is a sunken rocky patch, and about the same distance from the shore, half a mile west of Punta Caribici, are some rocks above water, and about half a mile south-westward of the same point is a rock with 5 feet over it. The 10-fathom contour line runs at an average distance of 1½ miles from the shore, and that of 20 fathoms at about 2¾ miles.

About 3 miles north-east of Punta Salsa is Monte Sedita, 1,400 feet above the sea, westward of, and below which, is the village of Montallegro. East of Fiume Canna, at about a mile from the coast, is the town of Siculiana (ancient Cena); it is pleasantly situated upon two hills. There are extensive sulphur mines in the neighbourhood, and a loading place on the west bank of the river. Siculiana has railway communication with Porto Empedocle.

Anchorage.—Temporary anchorage will be found at 1½ miles from the shore in depths of from 9 to 11 fathoms, over mud, with the castle at Siculiana bearing 42° true.

General charts 165, 1440, 2158a, b, 449.

Chart 186, Mazzara to Palma. Var. 8° W.

Capo Rossello is a conspicuous head composed of brown earth cliffs, 325 feet high, with a white lighthouse and keeper's dwellings upon it; about a mile to the north-east is the village of Realmonte. The cliffs upon the east side of the cape are nearly perpendicular, and off the points 1½ miles from either side of it are several rocks both above and under water, extending a quarter of a mile out; Balata Vecchia, which lies half a mile south-east of the cape, is 13 feet above the sea. *See* view facing page.

LIGHT (*Lat. 37° 18′ N., Long. 13° 27′ E.*).—The lighthouse on Capo Rossello is a white circular tower, 28 feet in height, with dwelling attached, exhibiting, at an elevation of 325 feet above the sea, an *alternating fixed* and *flashing* light *every forty seconds*, thus:—*white fixed, twenty-six seconds;* partial eclipse, *five seconds; red flash, four seconds;* partial eclipse, *five seconds;* it is visible in clear weather from a distance of 25 miles, but is obscured by the old lighthouse when within a distance of 3¼ cables from the shore.

Coast. — From Capo Rossello to Punta Bianca, a distance of 12 miles in a south-easterly direction, the cliffs are of various heights round the several bays, as far as Porto Empedocle, which is 4 miles to the eastward; hence to Punta Bianca the coast is divided into three equal portions, by the Fiume Agregas and Fiume Naro, with sloping banks varying in height from 150 to 180 feet above the sea.

Within, the land rises in irregular contours to an elevation of upwards of 1,700 feet, at a distance of 5 miles from the coast, having the appearance of three ranges forming a semi-amphitheatre, the slopes being broken by the rivers and watercourses.

Depths off-shore.—The shore generally, to the distance of half a mile, is bordered by ledges having on them from 6 to 18 feet water. Beyond this, the soundings are irregular, the 20-fathom contour line running about 4 miles from the beach, but including some detached rocks.

Plan of Port Empedocle on 2113.

PORTO EMPEDOCLE, the port of Girgenti, is formed by two breakwaters enclosing the new port and by an inner mole, inside which is the old port.

The western breakwater extends from the shore about 1½ cables westward of the old mole, for a distance of about 1,080 yards in a southerly direction.

The eastern breakwater, commencing at about the same distance eastward of the old mole, has a length of about 1,500 yards, and commencing in a south-south-easterly direction curves round to south-

No. 883.—CAPE ROSSELLO LIGHT—ALTERATION IN CHARACTERISTICS.

Former Notice.—No. 400 of 1915.

Position.—Lat. 37° 17½′ N., long. 13° 27½′ E.

Details.—The group flashing light has been replaced by a new light having the undermentioned characteristics:—

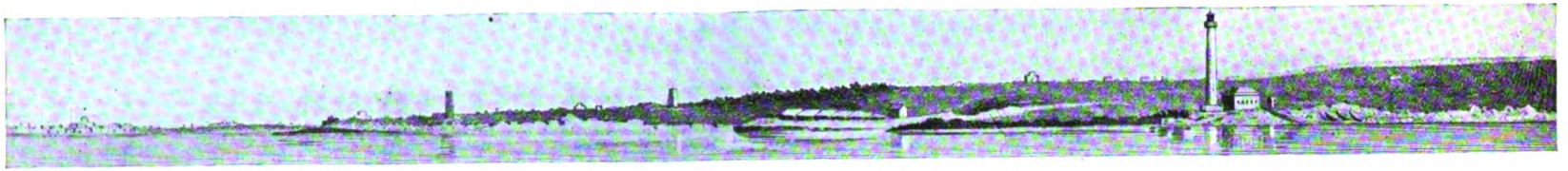
Character.—A *group flashing white* light showing *two flashes every ten seconds*, thus:—

Flash,	eclipse,	flash,	eclipse.
½ sec.	2 secs.	½ sec.	7 secs.

Visibility.—24 miles.

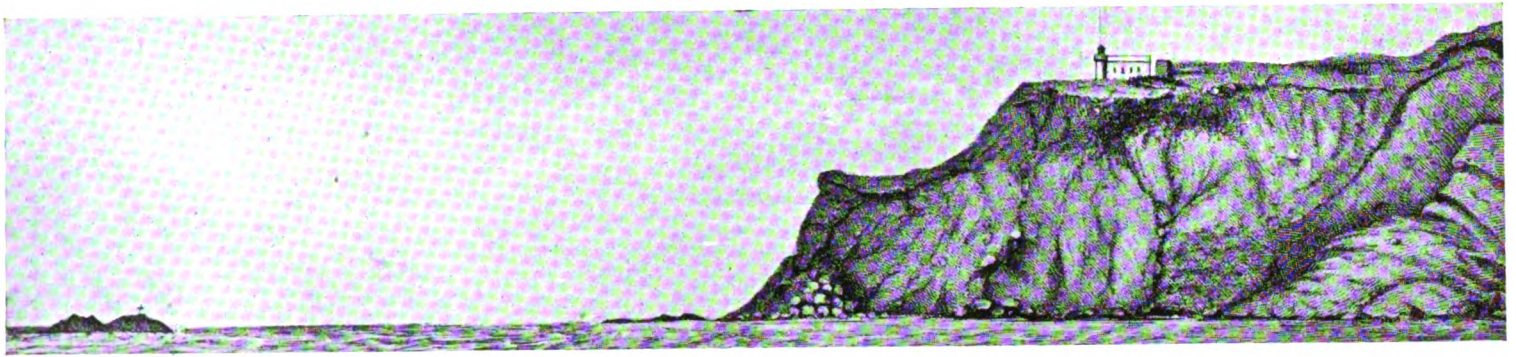
Remarks.—The other characteristics of the light remain unchanged.

Chart No. 186. Med. 1, p. 542.



Mazzara. *Capo Sorello.* *Old lighthouse.* *Old semaphore.* *Lighthouse bearing 22° true.*

Capo Granitola.



Balata Vecchia. *Lighthouse bearing 305° true.*

Capo Rossello.

Plan of Port Empedocle on 2113. Var. 7° 50′ W.

west and west. The entrance between the breakwater heads is 240 yards in width.

The old mole, inside, and forming the old port, has a south-easterly direction for about 300 yards, and then turns to the eastward for about 80 yards.

Depths.—The depth in the new port, except for a short distance southward of the old mole, where it is shoaler, is from 18 to 23 feet. Vessels drawing 21 feet can enter.

LIGHTS (*Lat. 37° 17′ N., Long. 13° 32′ E.*).—About 20 yards from the extremity of the eastern breakwater, an iron standard on a small red masonry house, 16 feet in height, exhibits, at an elevation of 27 feet above the sea, a *fixed green* light, which is visible from a distance of 4 miles, in clear weather, but only faintly visible inside the port.

About 50 yards inside the extreme of the west breakwater an iron standard on a small red iron house, 16 feet in height, exhibits, at an elevation of 28 feet above the sea, a *fixed red* light, which in clear weather is visible from a distance of 4 miles.

A *fixed white* light is shown at an elevation of 56 feet above the sea, from a small white truncated cone tower, 36 feet in height, on the head of the old mole, and is visible in clear weather from a distance of 10 miles.

Buoy.—A mooring buoy lies in 3¼ fathoms near the centre of the new port.

Pilots.—The regulations and rates of pilotage are the same as at Licata. *See* page 549.

Anchorage.—The anchorage, about 6 cables 152° true from the western breakwater head, is in 6 or 7 fathoms water, over sand, or sand and mud; or closer in, in a depth of 4½ fathoms, about 2 cables southward of the eastern breakwater; vessels, unable to go inside the mole, load in fine weather with moderate expedition, but at times it is tedious and dangerous. These anchorages are not safe in the fall of the year when south-west gales occur.

Directions.—*See* page 546.

Tides.—It is high water, full and change, at Porto Empedocle, at about IIIh. 50m. The rise is from 3 to 9 inches, but the tide is irregular, especially at neaps. The currents along shore run according to the direction and force of the wind, attaining a maximum rate of about a mile an hour.

Town.—La Marina, with extensive sulphur stores, extends along the shore, and the railway station is at the eastern end. Rising above some cultivated ground 1½ miles to the north is Monte Monserrato,

Plan of Port Empedocle on 2113. Var. 7° 50′ W.

1,040 feet above the sea, below which is the cemetery (*see* view on sheet 190). Sulphur abounds in the hills in the eastern vicinity. The population of La Marina in 1912 was 11,174.

Communication. — Steamers every week to Syracuse and Palermo, calling at intermediate ports on the south coast, also steamers to most European and North American ports monthly. Railway communication with Girgenti, thence to Termini, on the north coast joining the main line between Palermo and Messina; or to the eastward to Catania or Licata viâ Caniculla junction; there is a line also to Siculiana, and it is to be continued to Castelvetrano; telegraphic communication with all lines; the telegraph office is open till midnight.

Coal and supplies.—Porto Empedocle is not a coaling station, the coal being imported for railway and mining purposes only.

Supplies of fresh meat, vegetables, and bread may be procured, but they are not plentiful; water, but only fit for boilers and washing purposes, may be obtained near the root of the west mole.

Trade. — The principal trade is the export of sulphur, the other exports are rock salt, almonds, wheat, and beans. The imports are coal and artificial manure.

Shipping. — In 1911, 460 steam vessels, with a total tonnage of 398,029 tons, entered the port, and 658 sailing vessels, with a total tonnage of 43,967 tons.

Plan of Girgenti on 190.

Girgenti (*Lat. 37° 18′ N., Long. 13° 35′ E.*) (Gergent of the Arabs), with a population of 26,814 in 1912, stands on the side of a hill about 1,000 feet above the sea, and about 2½ miles to the north-east of the port. It is irregularly built, most of the streets being narrow, with numerous churches and convents; a cathedral (a large heavy structure) crowns the whole, giving it an imposing aspect from seaward. A British Vice-Consul is resident.

The high, rocky mount (1,152 feet) eastward of the town named Rupe Atenea, is the site of the temple of Minerva, and below it towards the sea is that of the ancient Agrigentum, renowned for power and commercial enterprise, and which contained upwards of 300,000 inhabitants.

The space which it occupied is now richly cultivated with vineyards and olive trees, and ruins of city walls, temples, tombs, and other vestiges are scattered over the entire site. Among the ruins of this once famous locality is a very perfect specimen of early Greek architecture, named the temple of Concord.

Hospitals.—There are two hospitals at Girgenti.

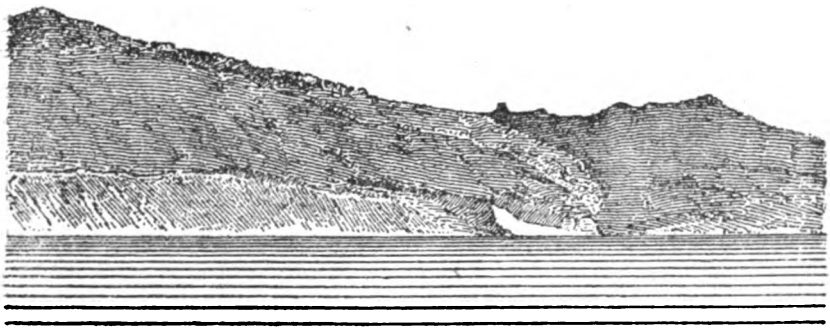
General charts 186, 165, 1440, 2158a, b, 449.

Plan of Girgenti on 190. Var. 7° 50′ W.

Fiume Agragas. — Punta Girgenti is situated 2½ miles south-east of the port, and here the Fiume Agragas runs into the sea; it winds in for about 2 miles north, then divides, one branch coming from the eastward between the sites of Agrigentum and a Roman camp, the other from the north-west, through the valley of San Leonardo, between Girgenti and Monte Monserrato. A short distance within the shore, on right bank of the river, is Torre San Giuseppe, elevated 180 feet, and a mile eastward, the ruined tower of Abbate, 153 feet above the sea.

La Secca (Melville shoal) (*Lat. 37° 13′ N., Long. 13° 35′ E.*), irregular and rocky, is rather more than 2 miles in length in a north-west and south-east direction inside the 10-fathom line, and about 6 to 7 cables in breadth, with depths varying from 3 to 8 fathoms. It lies 2¾ miles from the shore, and from the depth of 3 fathoms, near the central part of the shoal, Porto Empedocle west breakwater lighthouse bears 337° true, distant 3$\frac{7}{10}$ miles; the southern patch of 3 fathoms lies 148° true, distant 8 cables from the preceding similar depth.

Clearing marks. — Torre Monterosso, open southward of Capo Rossello, bearing 315° true, leads southward of the shoal. Torre Montechiaro (over the coast 2 miles eastward of Punta Bianca) in line with the hill over Punta Bianca, bearing 113° true, leads half a mile to the north of the shoal.



Torre Montechiaro in line with hill over Punta Bianca, bearing 113° true.

Monte Montserrato in line with Porto Empedocle East breakwater lighthouse, bearing 5° true, leads to the westward. *See* view on plan.

Chart 186, Mazzara to Palma.

Fiume Naro.—The mouth of the Fiume Naro is 3 miles beyond that of Agragas; it trends in a north-easterly direction for a mile, there uniting with the Boraidote, which flows to the southward, and

General charts 165, 1440, 2158a, b, 449.

Chart 186, Mazzara to Palma. Var. 7° 50′ W.

the former to the northward of a ridge (9 miles from the sea), on which is the town of Naro, 1,950 feet above the sea.

Scoglio Bottazza (Peril rock) is a small pinnacle, with one fathom water over it, and depths of from 5 to 7 fathoms close around it. It lies 7 cables south-westward of the entrance to Fiume Naro.

Punta Bianca is remarkable on account of its colour; the beach north-west of it is backed by earth cliffs of considerable height, which diminish towards the mouth of the Naro, distant 3 miles. A mile to the eastward of the point is Monte Grande, 870 feet above the sea, and at 3 miles in the same direction is a conspicuous tree on the fall of Monte Narbona.

Scoglio Patella (*Lat. 37° 11′ N., Long. 13° 40′ E.*). — A few rocks lie off Punta Bianca, and 4 cables south-westward from its extremity is Scoglio Patella, 8 feet high. The rock is steep-to on its south and east sides, but its north-west side should have a berth of at least a cable. The passage between it and Punta Bianca is not recommended, but the deepest water is nearer the rock.

Off-shore soundings.—The 100-fathom contour line extends from 8 to 10 miles off this coast, but there are several banks beyond this limit, with as little as 30 fathoms over them.

Chart 186, and plans 190 and 2113.

Directions.—Approaching Porto Empedocle from the eastward, give Scoglio Patella a berth of three-quarters of a mile, steering 316° true, which will lead in not less than 8 fathoms water nearly the same distance outside Scoglio Bottazza (Peril rock), and nearly midway between La Secca and the shore, observing the clearing mark for that shoal.

From the southward, bring Monte Montserrato between the breakwater lighthouses, bearing 5° true, and steer for it, westward of La Secca. From the westward, give the shore between Capo Rossello and Porto Empedocle a berth of a mile, and anchor off the mole as before directed.

At night, when Scoglio Patella cannot be seen, bring Porto Empedocle Old mole *fixed white light* to bear 323° true, and steer for it, which will lead nearly midway between La Secca and Scoglio Bottazza.

Chart 186, Mazzara to Palma.

Coast.—About 2 miles to the south-east of Punta Bianca is Punta Montechiaro, over which on the summit of a hill, 440 feet above the sea, is a square castle, Torre di Montechiaro; the shore is rocky, and the sea in bad weather breaks some distance off. Two miles beyond

No. 199.—Capo Passaro (Passero) Light—Alteration in Characteristics.

Position.—On Isola di Capo Passaro.
Lat. 36° 41′ N., long. 15° 10′ E.

Details.—The alternating fixed white and flashing red light has been replaced by a light having the undermentioned characteristics:—

Character.—A *group flashing white* light showing *two* flashes *every twenty seconds*, thus:—

Flash,	eclipse,	flash,	eclipse.
2½ secs.	2½ secs.	2½ secs.	12½ secs.

Visibility.—17 miles.

Chart No. 187. Med. 1, p. 557.

Chart 186, Mazzara to Palma. Var. 7° 40′ W.

this the Fiume Palma, flowing with several branches from the high land above, enters the sea.

East of the entrance is Torre San Carlo, and in the bay to the westward La Marina di Palma, with some small houses.

Castellazzo di Palma, about 3 miles eastward of Fiume Palma, is a small tower in ruins, 920 feet above the sea, but it is not conspicuous, as it is the same colour as the land.

Palma.—The town of Palma is situated at the head of a lovely valley, about 2 miles north-east of La Marina, the Gallia hills rising close over it to the height of 1,400 feet. It has a trade in almonds, wine, dried fruits, and sulphur.

Anchorage.—Off Marina di Palma there is temporary anchorage in depths of from 5 to 8 fathoms, over good holding ground, but much exposed.

Chart 187, Palma to Catania.

Rocca San Nicola is a conspicuous islet, close to the coast, about 11 miles south-eastward of Punta Bianca; Torre San Nicola lies about half a mile eastward of the islet, and Torre Gaffi 2 miles westward. About midway between Rocca San Nicola and Torre Gaffi is Pisciotta spring, where a conspicuous windmill pumps the water to Licata railway station; 300 or 400 yards east of the spring is some more water of very inferior quality; this is the so-called water of Pisciotta, which is obtainable from boats at Licata.

Rocca Mudda fedda, about one mile eastward of Rocca San Nicola, is an enormous rock joined to the mainland by a sandy isthmus. To the eastward of the rock is a small inlet suitable for sheltering fishing boats. The coast hence to Licata, 3 miles east-south-east, is rocky, and backed by a ridge of hills 500 feet above the sea.

Plan of Port Licata on 187.

LICATA (*Lat. 37° 6′ N., Long. 13° 57′ E.*). — About 15 miles to the south-east of Punta Bianca, on the west side of the mouth of the Fiume Salso, is the town of Licata (ancient Phintia), standing on the beach and slope of the hills; it is defended by Castel San Angelo upon an elevation on the west of the town, 479 feet above the sea; Castel San Giacomo in ruins lies on a rocky projection over the town. The town contains several churches and convents, has a population of about 23,000, and a British Vice-Consul is resident.

Port.—The shore fronting the town is rocky, the depths gradually deepening to 5 fathoms at half a mile off. The west mole extends in a southerly direction from the west part of the town for a distance of

General charts 165, 1440, 2158a, b, 449.

Plan of Port Licata on 187. Var. 7° 40′ W.

about 350 yards, and about 50 yards from its commencement a spur about 120 yards long extends to the eastward.

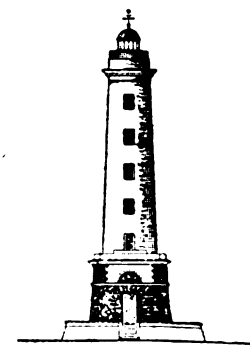
The east mole projects, from the shore under Castel San Giacomo, in a southerly direction for about 430 yards, with a western bend of 400 yards, leaving between its extreme and that of the west mole, an entrance about 350 yards in width.

Seaward of the two moles a detached breakwater, 800 yards long and having a curved shape, is in course of construction, and about 500 yards of the western part, is partly above water. This breakwater when completed will leave a passage about 300 yards wide between its eastern extremity and that of the eastern mole, and about 200 yards between the western extremity and western molehead.

The lights on the heads of the moles are obscured over the detached breakwater.

Depths.—There are depths of 14 to 18 feet alongside the eastern mole; and 12 to 15 feet alongside the western mole, and between the breakwater and the entrance of the harbour the depths vary from 2½ to 5½ fathoms, but from 30 to 40 yards from the breakwater the water shoals rapidly to 2 or 3 feet. The harbour is much subject to silt from the Fiume Salso during the floods of spring. A space about one cable square immediately inside the east molehead has been dredged to a depth of 18 feet. Dredgers are at work in the port.

LIGHTS (*Lat. 37° 6′ N., Long. 13° 57′ E.*).—On the inner end of the breakwater, near Castel San Giacomo, a white conical tower, 115 feet in height, on a dark square building, exhibits, at an elevation of 131 feet above the sea, a *flashing white* light *every five seconds*, the *flash* showing for *one-tenth second:* it is visible in clear weather from a distance of 18 miles. For arc of visibility, *see* Light list.



San Giacomo lighthouse.

An *occulting green* light *every five seconds*, thus:—light, *three seconds*; eclipse, *two seconds*, is exhibited, at an elevation of 28 feet above the sea, from an iron standard on the East molehead, and in clear weather is visible from a distance of 4 miles. For arc of visibility, *see* Light list and plan.

A similar standard to the preceding, and situated on the West molehead, exhibits a *fixed red* light, which is visible in clear weather from a distance of 5 miles. For arc of visibility, *see* Light list and plan.

Signal station.—Semaphore.—On Castel San Angelo there is a semaphore, with which vessels can communicate.

General charts 165, 1440, 2158a, b, 449.

No. 1281.—PORT LICATA—ALTERATION IN CHARACTERISTICS OF LIGHT.

Position.—On the head of the west mole.

Lat. 37° 05½′ N., long. 13° 56¾′ E.

Details.—The fixed red light has been replaced by a light having the undermentioned characteristics:—

Character.—A *flashing red* light *every three seconds*, thus:—

Flash,	eclipse.
$\frac{3}{10}$ sec.	$2\frac{7}{10}$ secs.

Visibility.—Distance not stated; from 165° (*S. 8° E. Mag.*), through south, to 325° (*N. 28° W. Mag.*), and from 85° (*S. 88° E. Mag.*) to 110° (*S. 63° E. Mag.*).

Variation.—7° W.

Chart No. 187. Med. 1, p. 548.

No. 1281.—Port Licata—Alteration in characteristics of Light.

Position.—On the head of the west mole.

Lat. 37° 05½′ N., long. 13° 56½′ E.

Details.—The fixed red light has been replaced by a light having the undermentioned characteristics:—

Character.—A flashing red light every three seconds, thus:—

Flash.	eclipse.
$\frac{5}{10}$ sec.	$2\frac{5}{10}$ secs.

Visibility.—Distance not stated; from 165° (S. 8° E. Mag.), through south, to 325° (N. 25° W. Mag.), and from 85° (S. 85° E. Mag.) to 110° (S. 65° E. Mag.).

Variation.—7° W.

Chart No. 187. Mod. 1, p. 546.

Plan of Port Licata on 187. Var. 7° 40′ W.

Beacons.—A black masonry beacon, in the form of a truncated pyramid, 34 feet in height and surmounted by a black sphere, stands inside the extremes of each mole.

The beacon on the west mole, in line with San Giacomo lighthouse, bearing about 65° true, defines the western limit of the works in progress on the detached breakwater, and the beacon on the east mole, in line with the same lighthouse, bearing about 11° true, marks the eastern limit of works.*

A rock on the northern side of the harbour is marked by a masonry beacon, 8 feet in height, in the form of a truncated cone, and surmounted by a black staff and ball.

CAUTION.—As the work for the completion of the eastern end of the detached breakwater is now (1913) in progress, and sometimes no buoy marks the extreme, a wide berth should be given to it. Vessels should not enter the port after dusk without the aid of a pilot.

Pilots will board vessels about 2 miles eastward or westward of the entrances. The rates of pilotage are as follows for sailing vessels from the offing to the port:—

Tons net registered.	Lires.	Tons net registered.	Lires.
1 to 50	15	501 to 600	50
51 „ 100	25	601 „ 700	55
101 „ 200	30	701 „ 800	60
201 „ 300	35	801 „ 900	65
301 „ 400	40	901 „ 1,000	70
401 „ 500	45	1,000 and over	75

Sailing vessels which are piloted from the offing to the roads pay three-quarters of the rate.

Sailing vessels piloted to the port from the roads pay:—

Half the above rate if they used the pilot to go into the roads.

The whole fee, as if they had been piloted from the offing, if they did not use a pilot to go into the roads.

Steam vessels in all the above cases pay three-quarters of the amount payable by sailing vessels.

Communication.—Weekly steamers to Syracuse and Palermo, and frequently to Malta; railway communication with Syracuse, Girgenti, and Palermo; telegraphic communication with all lines. Telegraph office is open till midnight.

Coal and supplies.—About 5,000 tons of coal are kept in stock, and 2,000 tons could be put on board in 24 hours by all firms; the

* The position of the western mole beacon is doubtful, and the western entrance is dangerous (1912).

General charts 165, 1440, 2158a, b, 449.

Plan of Port Licata on 187. Var. 7° 40′ W.

coal is shipped in baskets and put into native craft, of which there are 30, holding about 4 to 5 tons each. Scirocco winds may prevent or impede coaling.

Supplies of fresh provisions are plentiful; water is good and brought off in wooden casks in lighters on application to Harbour Master. *See* also page 547 for caution as to Pisciotta spring water.

Trade. — Sulphur is the principal export, 110,154 tons of which were shipped in 1911; the other exports are asphalt, beans, and almonds; the imports are coal, timber, phosphates, petroleum, and grain.

Shipping. — In 1911, 253 steam vessels, with a total tonnage of 245,077 tons, entered the port, and 631 sailing vessels, with a total tonnage of 35,205 tons.

Chart 187, Palma to Catania.

Anchorage. — There is temporary anchorage about 1½ miles south-west of the town, in 10 fathoms water, over sand, but it is much exposed.

Fiume Salso (*Lat. 37° 6′ N., Long. 13° 57′ E.*), separating the provinces of Girgenti and Caltanisetta winds through the extensive plain of Licata, which is enclosed by a ridge, 4 miles from the coast, elevated from 1,000 to 1,500 feet above the sea. The entrance, about half a mile northward of Castel San Giacomo, is over a shallow bar about half a mile in extent, on which the surf beats heavily with southerly winds, and several rocks fringe the western shore; boats can enter the river, but the passage is narrow and intricate.

Coast. — Between Licata and Capo Scalambri, a distance of 33 miles, the coast forms a bay, the coast being in general low, with long sandy beaches. There are some isolated ridges of from 150 to 400 feet above the sea near the coast, beyond which are extensive plains, backed by hills of from 2,000 to 3,000 feet above the sea at a distance of 15 miles inland. There are several streams running into the bay, the two principal of which are the Maroglio, near the centre, and the Durillo, eastward of it.

Patches of rocks lie off the shore in several places and together with the shallow frontage of 6 and 18 feet, do not, however, extend more than half a mile. On the west side of the bay, banks of 5 fathoms extend for a distance of 1½ miles, and a depth of 20 fathoms is obtained at about 5 miles off, the bottom being chiefly of mud and sand.

General charts 165, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 30′ W.

Two Rocks point (Due Rocche). *Torre Falconara, bearing 323° true, distant 3½ miles.*

Two Rocks point, Punta due Rocche, lies 4½ miles eastward of Licata, and a mile further is Punta Falconara, upon which is a tower. These points are fronted by rocks and shallows for a distance of 3 cables; Monte Desusino, 1,407 feet above the sea, rises 2½ miles from the coast. The coast, partly of low cliffs, continues to the eastward for 4 miles to Torre di Manfria, a square grey tower on a rocky headland, the hills close over it being 407 feet above the sea.

Shoals with a depth of 5 fathoms lie off this part of the coast for a distance of 1½ miles, and there are several patches of rock along the shore to the eastward. Capo Soprano, 4 miles east-south-east of Torre di Manfria, is the next conspicuous head, and on its elevated ground to the eastward is the town of Terranova.

TERRANOVA.—The town of Terranova (ancient Gela) stands on a hill; it has a fine palace and a good hospital, but the streets are irregular and dirty, its castle, churches, and convents appear to be neglected, and the whole town suffers much from a scarcity of water. The population is about 22,000; there is a trade in sulphur, corn, wine, and a coarse cloth which is manufactured in the town. A British Vice-Consul resides here.

The Fiume Maroglio is joined by the Dissueri at 2 miles from the coast, and flows through richly-cultivated plains from the high land on the north-east, entering the sea on the east side of the town.

LIGHT (*Lat. 37° 4′ N., Long. 14° 15′ E.*).—A small white square building, situated on the beach, near the landing places, exhibits, at an elevation of 16 feet above the sea, an *occulting white* light *every fifteen seconds*, thus:—light, *ten seconds;* eclipse, *five seconds;* it is visible in clear weather from a distance of 9 miles. For arc of visibility, *see* Light list.

Anchorage.—The anchorage, about 1½ miles from the shore, in 6 fathoms water, over sand and mud, is much exposed; south-west winds send in a heavy sea, and vessels should be ready to leave at any moment. Small vessels lie at the west end of the Caricatore (shipping place), under the Torre dell' Insegna, which stands on the high land over Capo Soprano, off which, however, are some rocks.

Communication.—Weekly communication by steamer with Palermo and Syracuse and intermediate ports, and frequently with

Chart 187, Palma to Catania. Var. 7° 30′ W.

Malta. By railway with Licata and Syracuse, and telegraphic communication with all lines. The telegraph office is open till 9 p.m.

Coal and supplies.—There is no coal. Supplies of fresh provisions are not plentiful, and water is scarce and not good.

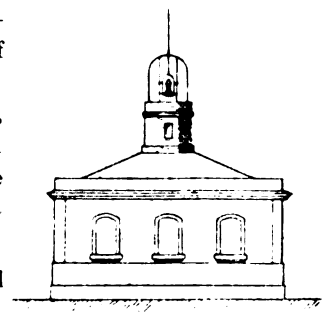
Hospital.—There is only one hospital, for civil and military.

Caltagirone.—About 17 miles north-eastward from Terranova is Caltagirone (Hibla Minor), considered the best mountain town of the island; it has manufactories of pottery and calico, and carries on an active trade in wines, oil, &c.

Coast. — About 7 miles to the south-east of Capo Soprano the Fiume Durillo (the ancient Achates) enters the sea, and a white house stands within the sandy beach a little to the westward of its entrance; at the foot of the hills, a mile to the north, is Lago Biveri or Lentini. Punta Safaglione, situated 6 miles in a south-south-easterly direction, is rocky and fronted by rocks extending about a quarter of a mile from the shore.

Scoglitti, a village with about 1,400 inhabitants, and situated 2 miles southward of Punta Safaglione, has a considerable trade in wine, and may be known by various storehouses or magazines standing on the side of a small rocky bay which opens to the westward; the strong winds prevalent from this quarter in winter cause much damage.

LIGHT (*Lat. 36° 53′ N., Long. 14° 26′ E.*). — From a circular white house, 33 feet in height, at Scoglitti, is exhibited, at an elevation of 46 feet above the sea, an *occulting white* light *every ten seconds*, thus: — light, *five seconds*, eclipse, *five seconds*, which is visible in clear weather from a distance of 8 miles. For arc of visibility, *see* Light list.



Scoglitti lighthouse.

Buoy. — There is a small cylindrical iron buoy in the roadstead, off Scoglitti, for the use of mail steamers.

Life-saving station. — A rocket apparatus is maintained at Scoglitti.

Communication. — Steamers between Palermo and Syracuse call weekly, and there is a railway station at Vittoria, distant 8 miles, on the line to Syracuse; telegraphic communication with all parts.

Wireless telegraph station.—There is a wireless station at Vittoria, near Scoglitti, always open to the general public. The call letters are I.C.V.

General charts 165, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 20′ W.

Supplies.—Fresh provisions are scarce, but there is an abundant supply of water from a public fountain.

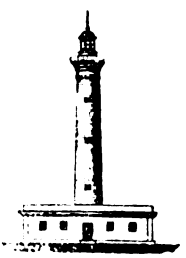
Coast.—To the southward of Scoglitti is another small bay on the south side of which is Punta Camerina and the site of ancient Camarina. At the head of the bay Fiume Ipari (the ancient Hipparis) flows into the sea through a marsh; it passes to the eastward of the town of Vittoria, situated 6½ miles to the north-east, and elevated 548 feet above the sea, which town has about 32,000 inhabitants and a trade in honey and silk.

Punta Bracetto and tower is 3¾ miles farther to the southward, and at a distance of 2¼ miles south-south-eastward is Capo Scalambri, with Punta Pietro and a low, ruined tower about midway. The shore between Scoglitti and the cape is bordered by shallow water, and 1½ miles southward of Punta Camerina, rocks awash extend half a mile from the shore; vessels should give it a wide berth in passing, keeping the lead going.

Capo Scalambri (Scaramia), ancient Bucra Prom., is a low, rocky point, and off it are some islets or rocks; a reef projects from the shore both east and west, so that caution is necessary when nearing it. During bad weather and westerly winds allowance should be made for the current, and the cape should not be approached too closely. *See* view, page 557.

On the east side of the cape is the little port of Secca (ancient Caucana), protected by a natural breakwater of rocks, and on the slope of the hill 3 miles north-east, Santa Croce Camerina village is situated, 328 feet above the sea. There is a coral fishery off the cape.

LIGHT (*Lat. 36° 47′ N., Long. 14° 30′ E.*).—On Punta Secca, the south-east extreme of Capo Scalambri, a *fixed white* light is exhibited, at an elevation of 124 feet above the sea, from a white circular tower, 113 feet in height, and surmounting a dwelling, and is visible in clear weather from a distance of 17 miles.



Capo Scalambri lighthouse.

Mazzarelle.—Three miles eastward of Capo Scalambri is Il Caricatore di Mazzarelle, with a large tower and several storehouses. There is a considerable trade between here and Malta. A British Vice-Consul is resident here.

Light.—From an iron candelabrum on the coast at Mazzarelle is exhibited a *fixed red* light, visible in clear weather from a distance of 3 miles.

General charts 165, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 20′ W.

Coast. — About 8 miles south-eastward of Mazzarelle, a broad and elevated headland terminates in Punta Corvo, which is rocky, and several streams run into the intervening bay, which is partly of sand; some houses known as Donna Lucata lie on the coast, 4 miles from Mazzarelle.

The town of Scicli (ancient Casmenæ), 4½ miles northward of Punta Corvo, has several churches, and a population of 16,200; it is 692 feet above the sea, with a stream flowing past its western slope. Modica (ancient Motyca), 5 miles farther, in the same direction, but on the opposite side of the stream, is a town with an export trade of grain, oil, wine, &c. Near to it is the valley of Ipsica, famed for its dwellings excavated in the rock. The railway between Terranova and Syracuse passes near Scicli and Modica.

Punta Religione (Regiglione), sandy, and showing bright yellow on the east side, is 3¾ miles east-south-eastward from Punta Corvo, with several small sandy bays lying between, fronting some lagoons; upon a central slope is a tower, and on a point a little to the west is the village and cove of Sampieri, or San Pieri.

Pozzallo.—Between Punta Religione and Punta Grotta, 8½ miles to the eastward, is a bay 2½ miles deep, on the west side of which, 3½ miles from Punta Religione, is the town of Pozzallo, the principal Caricatori of Modica. It has a palace, churches, several magazines, and about 6,590 inhabitants. A British Vice-Consul is resident here.

LIGHT (*Lat. 36° 43′ N., Long. 14° 52′ E.*). — From a grey iron framework support, in front of a small white masonry house, erected on the landing place at Pozzallo, is exhibited, at an elevation of 33 feet above the sea, a *white occulting* light *every twenty-three seconds*, thus:—light, *eighteen seconds;* eclipse, *five seconds.* It is visible from a distance of 11 miles in clear weather. For arc of visibility, *see* Light list and chart.

Anchorage. — Summer anchorage in depths of from 7 to 12 fathoms, over sandy bottom, may be obtained 4½ cables off a small pier.

Communication.—Steamers every week to Palermo and Syracuse, calling at the intermediate ports, also frequently to Malta; railway communication with Terranova and Syracuse, and telegraphic communication with all lines. The telegraph office is open till 9 p.m.

Supplies. — Moderate supplies of fresh provisions may be procured; the water is not very good.

Spaccaforno, a walled town on a hill 5 miles north-east of Pozzallo, has numerous churches, convents, and public buildings.

General charts 165, 1800, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 20′ W.

Coast.—La Favara, which flows from the northward past the town of Spaccaforno, enters the sea by two mouths, 2½ miles eastward of Pozzallo, and from this a beach curves for 3½ miles in a south-east direction towards Punta Grotta, the country within being low and marshy; there are some ancient and other ruins along the shores of the bay.

Punta Grotta (Marza) has reefs extending in two points to the southward; Scoglio Jannuzzo, a small rock above water, 4 cables from the coast, marks the eastern extreme, and Secchi Circia, with depths of 2 fathoms and 4¾ fathoms, lying, respectively, three-quarters of a mile westward and half a mile south-westward of Jannuzzo, lies on the western extreme.

Scogli Porri, a group of flat rocks, 17 feet above the sea, lies about 1½ miles westward of Punta Grotta, with from 8 to 10 fathoms water between them and Secchi Circia; various birds frequent the rocks for a species of wild leek growing on them.

LIGHT (*Lat. 36° 41′ N., Long. 14° 57′ E.*).—On the highest rock of Scogli Porri, from a masonry tower, is exhibited, at an elevation of 34 feet above the sea, an unwatched *occulting red* light *every ten seconds*, thus:—light, *five seconds;* eclipse, *five seconds;* it is visible in clear weather from a distance of 8 miles.

Outlying shoals.—A rocky shoal, with 4 fathoms water on it, lies 7 cables south-westward of Porri lighthouse; another with 5¾ fathoms lies 7 cables southward of the lighthouse; another with 9 fathoms, 1 7/10 miles in the same direction; and nearly midway between these two latter is one with 7 fathoms over it.

Baia della Marza (Porto Ulisse), between Punta Grotta and Isola della Correnti, 6½ miles south-eastward, is 2 miles deep, with shores broken by rocky points and sandy beaches. The depths are irregular, but a depth of 10 fathoms will be found in the centre of the bay over a sandy bottom. There is a castle on a point 1¾ miles from Punta Grotta, and eastward of the castle, charcoal and wood are embarked; the village of Marza stands about half a mile northward of the castle, and near the centre of the bay a spring of fresh water rises near the beach. At the back of the beach is a salt marsh.

Punta delle Formiche is a low, white cliff about 1½ miles to the north-west of Correnti, the shore between forming a bight with a beach broken by rocky points. Off Punta Formiche there are five black rocks appearing just above the water, and south of it a reef extends for a distance of a third of a mile.

Within the bight, between Punta Formiche and Isola Correnti is a

General charts 165, 1800, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 20′ W.

small cove formed by picturesque white cliffs, where are the remains of some ancient sepulchres, in a kind of rubble work. The neighbourhood is low, marshy, with several lagoons, and over-run in many parts with a luxuriant profusion of heaths, myrtles, fan-palms, capers, and junipers, in which numbers of singular reptiles and insects abound.

Reef.—A detached patch, with 12 feet water over it, lies nearly a mile to the southward of Punta Formiche.

Isola delle Correnti, a small sandstone island joined to the south extreme of Sicily by a causeway, has on its north-east side a natural mole, where the Maltese trading boats at times seek shelter. *See* view, page 557.

LIGHT (*Lat. 36° 39′ N., Long. 15° 5′ E.*).—On the south point of the island is a square flat-roofed yellow house, surmounted by a polygonal tower, 30 feet in height, the lantern of which is a little higher than the top of the house. The tower exhibits, at an elevation of 55 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 9 miles. For arc of visibility, *see* Light list.

Isola delle Correnti lighthouse.

Shoals.—Shallow water extends some distance southward of the islet, and a bank with 16 feet water over it, lies half a mile to the southward of the lighthouse, from which also two patches, with depths of 9 and 10 fathoms over them, lie 130° true and 90° true respectively, distant a mile.

A rocky knoll, with 9 fathoms water over it, lies with Correnti lighthouse bearing 64° true, distant 3¼ miles, and a similar patch is situated three-quarters of a mile north-westward of the preceding.

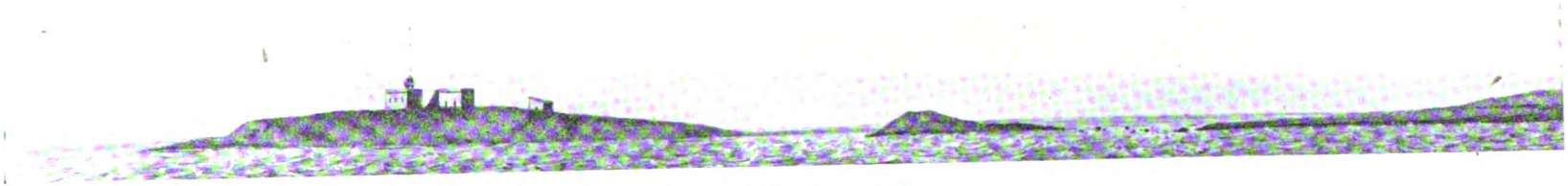
In 1905 an Italian steamer reported striking a bank 4 miles southward of Correnti lighthouse, but its existence is doubtful, and is shown as an obstruction only on the chart.

Coast. — From Isola Correnti the coast of Sicily trends about in a north-easterly direction for 3 miles to a small bay named Porto Palo, where there is anchorage for vessels of light draught in all winds but those from the southward. Round the shores of the bay, which are low and marshy, there are some rocks, and in the centre of the entrance is a shoal with a depth of 12 feet over it, 7 fathoms outside, and 4 fathoms in the passage on each side; within the bay there are from 2 to 3¼ fathoms water, over sand and mud. The eastern point is low and rocky, and trends in a north-easterly direction for 2 miles to Capo Passaro, the ancient Pachynus.

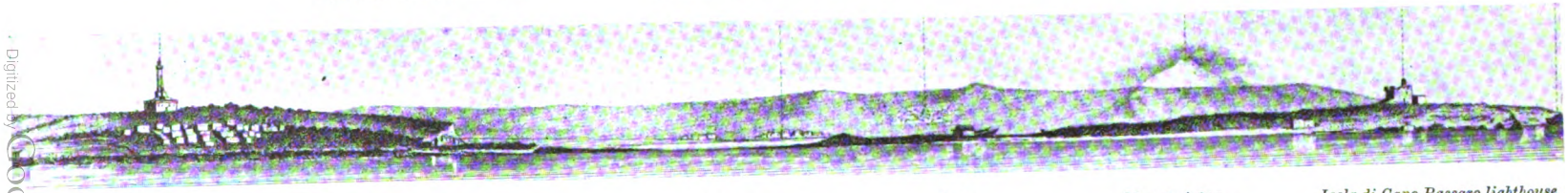
General charts 165, 1800, 1440, 2158a, b, 449.

Torre Bracetto. *Torre di Punta Pietro.* *Lighthouse, bearing 338° true.*

Capo Scalambri.

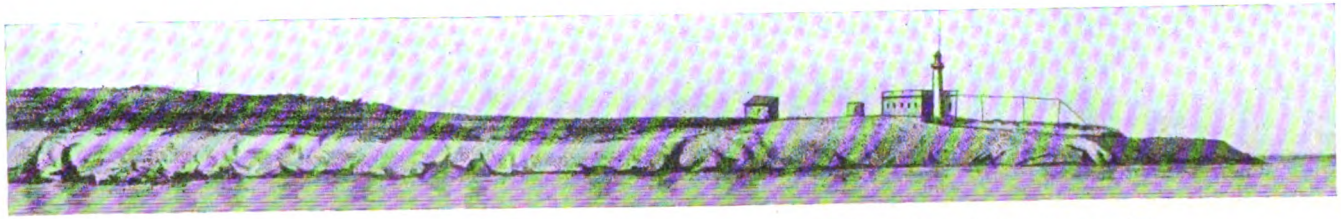


Lighthouse, bearing 271° true. Isola delle Correnti.



Cozzo Spadaro lighthouse, bearing 338° true. *Marzamemi.* *Noto.* *Mount Aetna.* *Isola di Capo Passaro lighthouse.*

Capo Passaro (Passero).



Lighthouse, bearing 33° true, distant 2 miles.

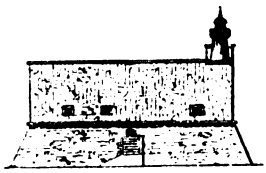
Capo Murro di Porco.

Chart 187, Palma to Catania. Var. 7° 20′ W.

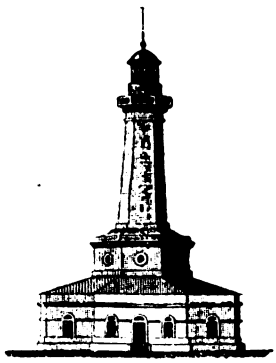
Capo Passaro (Passero). — Isola di Capo Passaro is about 1½ miles in extent, with a tower-redoubt on the cape or eastern point. The islet is arid, being composed of a singular accumulation of marble, lava, tufa, cinders, and oceanic deposits, and is high on all sides except the west, where it is connected to the mainland by a sandy neck, with 2 feet water over it.

On the point westward of the islet is the village of Porto Palo, and over it a conical hill named Cozzo Spadaro. The south-eastern projection of Sicily, for a distance of 10 miles inland, is composed of small hummocks, with a great deal of marsh land, and numerous lagoons near the shore; the population is sparse. *See* view facing page.

LIGHTS (*Lat. 36° 41′ N., Long. 15° 9′ E.*). — A white circular tower, 17 feet in height, above the north-east corner of a yellow fort, and 63 feet from the ground on Isola di Capo Passaro, exhibits, at an elevation of 127 feet above the sea, an *alternating fixed white* and *flashing red* light *every one and a half minutes*, showing thus:—*fixed white, sixty seconds;* eclipse, *fourteen seconds; red flash, two seconds;* eclipse, *fourteen seconds;* it is visible in clear weather from a distance of 14 miles. For arc of visibility, *see* Light list.


Isola di Capo Passaro lighthouse.

On the summit of Colle Cozzo Spadaro, and nearly a mile west of the fort on Isola di Capo Passaro, is a white octagonal tower, 120 feet in height, and having a square base, which exhibits, at an elevation of 270 feet above the sea a *fixed* and *flashing white* light *every one hundred and fourteen seconds*, showing:—fixed, *seventy-three seconds;* eclipse, *sixteen seconds;* flash, *nine seconds;* eclipse, *sixteen seconds;* it is visible in clear weather from a distance of 24 miles. For arc of visibility, *see* Light list and chart.


Cozzo Spadaro lighthouse.

Signal station.—Storm signals.—At Cozzo Spadaro lighthouse there is a semaphore and telegraph station. Storm signals are shown here.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from the shore on the north side of Isola di Capo Passaro; they extend in an easterly direction for about a mile, and in a north-easterly direction for about three-quarters of a mile.

General charts 165, 1800, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 20′ W.

The outer ends are marked with a floating beacon surmounted by a white pole by day and a *white* light at night. *See* Caution, page 73.

Tides.—At Capo Passaro and Isola Correnti it is high water at full and change, at about IIIh. 0m.; the greatest rise is 11 inches, but the tides are irregular, being influenced by the direction and force of the winds.

General charts 165, 1800, 1440, 2158a, b, 449.

CHAPTER VIII.

THE EAST COAST OF SICILY, THE LIPARI OR ÆOLIAN ISLANDS, AND THE NORTH COAST OF SICILY.

(*Lat. 36° 40′ N. to Lat. 38° 50′ N.*)
(*Long. 15° 40′ E. to Long. 12° 45′ E.*)

VARIATION IN 1912.—Decreasing about 7′ annually.

EAST COAST OF SICILY.

Chart 187, Palma to Catania. Var. 7° 20′ W.

Coast. — Between Capo Passaro and Capo Murro di Porco, a distance of 21 miles, the coast recedes, forming a large bay about 6 miles deep; the shores are in general very irregular and rocky, bordered by islets and shoal patches, all however lying within a mile of the shore; the northern part of the indentation is the deepest.

There are several streams and watercourses, and at about the centre of the above bay are the towns of Avola and Noto, behind which the mountain ridges slope from elevations of 2,000 feet, above the sea, at a distance of 10 miles from the coast.

Capo Marzamemi (*Lat. 36° 44′ N., Long. 15° 8′ E.*), 3½ miles northward of Capo Passaro, is a broad projecting point on which is the village of the same name. On a hill to the south-west of the village is the town of Pachino, 207 feet above the sea, the church of which, with the windmill near it, are conspicuous from seaward. The embayed coast from Passaro to Marzamemi is barren and desolate; the latter part is fronted by two small islets skirted with rocks and shallow water, and midway is an extensive salt lake.

Breakwater. — A breakwater is being constructed on Isola Grande, near Marzamemi.

Light.—A temporary *fixed red* light is exhibited, at an elevation of 15 feet above the sea, from the end of the breakwater; it is visible in clear weather from a distance of about 2 miles.

Communication. — Steamers between Palermo and Syracuse call weekly, and there is telegraphic communication during limited hours. The nearest railway station is at Rosolini, 9 miles distant.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from the shore near Marzamemi: they extend

Chart 187, Palma to Catania. Var. 7° 20′ W.

nearly a mile in an easterly direction, and the outer end is marked with a floating beacon, surmounted by a white pole by day, and with a *white* light by night. *See* Caution, page 73.

Anchorage.—There is good anchorage with westerly winds in the bay between Capo Passaro and Marzamemi, in from 9 to 10 fathoms water, about 1½ miles northward of the cape.

Depths off-shore.—Off the coast between Correnti and Marzamemi, 10 fathoms will be found within a mile of the shore, the bottom being generally mud. About 30 miles eastward of Capo Passaro there are some coral patches of 40 fathoms marked on the surveys of Captain Smyth, but depths of from 1,000 to 2,000 fathoms have been obtained in their vicinity.

Isolotto Vendicari, 3 miles northward of Marzamemi is low, small, rocky, and nearly connected to the main island by a sandy spit; the coast between is broken into small sandy bays, and opposite the islet are two salt lagoons; a tower stands on a rise beyond the southern lagoon, and another on the shore half a mile north of the islet. A sunken rock lies about 2 cables to the south-eastward of Vendicari.

Depths off-shore.—Between Marzamemi and Isolotto Vendicari the bottom is very irregular, there being depths of 3 and 5 fathoms at a mile off. Shoal water extends three-quarters of a mile northward of Capo Marzamemi; the outer edge, with a depth of 2 fathoms, is three-quarters of a mile from the adjacent shore.

Punta Bernarda (*Lat. 36° 52′ N., Long. 15° 9′ E.*), nearly 5 miles northward of Isolotto Vendicari, is a projection of the coast, which is skirted by rocks; upon it are several houses named La Ballata, or Marina di Noto, connected with the town of Noto by a broad road 3½ miles long. Half-way between Vendicari and La Ballata is the Fiume Tellaro di Noto, there are also other streams, and a salt lake. Two miles to the north of Ballata are a beach, jetty, and La Marina di Avola, consisting of several houses, distant half a mile, by road, from Avola.

Noto, near the site of the ancient Neetum, containing about 22,200 inhabitants, is conspicuous from seaward, stands on a hill 521 feet above the sea, 3½ miles west-north-westward of Punta Bernarda, and has a good road leading to the town of Avola, with which it is also connected by the railway to Syracuse. Noto has large squares, regular streets, a cathedral, several churches, and convents, and is one of the best-built and most agreeable towns of Sicily. Its trade is wine, oil, and sulphur.

The ruins of an amphitheatre and of a gymnasium are the principal remains of the ancient city, which stood about 4 miles north-west of the modern town, and was destroyed by an earthquake in 1693.

General charts 165, 180, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 20′ W.

The Fiume Noto winds through the plain below, and disembogues north of Punta Bernarda.

Avola, a town about 2½ miles northward of Punta Bernarda, is prettily and salubriously situated on a wooded eminence. It has several respectable edifices, tolerable streets, and a good market place, with an air of cleanliness and regularity. The population is about 11,000, and there is a traffic in wine, corn, cheese, almonds, oil, honey, and fruit. The adjacent country abounds in game, and supplies pasturage to a number of cattle, many of which are exported to Malta.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore near the mouth of the Fiume Noto, and extends 1½ miles in an easterly direction.

The outer end is marked with a floating beacon surmounted by a white pole by day and a *white* light by night. *See* Caution, page 73.

Fiume Cassibile (ancient Cacyparis) runs into the sea 5 miles northward of Punta Bernarda; one mile further on is Punta del Cane and 1½ miles back is Capo Negro. The coast between Punta Bernarda and Punta del Cane is low with several sandy coves and a few rocks; a patch lies about 2 cables off-shore, a little north of the mouth of Fiume Cassibile; fresh water may be obtained from the Cassibile, and the river abounds in trout.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore near Punta del Cane, and extend about 7 cables in an easterly direction. The outer end is marked with a floating beacon surmounted by a white pole by day and a *white* light by night. *See* Caution, page 73.

Anchorage.—All along the coast, north of Capo Passaro, a vessel may anchor in case of necessity, with westerly winds, choosing a berth by the lead; the bottom inshore is sandy, but farther off is stiff clay.

Capo Lognina (*Lat. 36° 58′ N., Long. 15° 17′ E.*) is situated nearly 4 miles east-north-eastward of Capo Negro, and here is Baia di Lognina, a small bay, formed by a large rock joined to the coast by a reef, on the north side of the cape, which latter is bold, with a round tower on it.

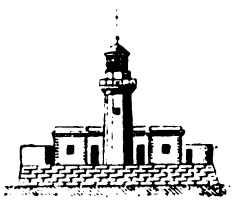
A shallow bank projects about half a mile from the southern shore. Between this cape and Murro di Porco is a fine bay with sandy coves, where vessels may find shelter from northerly winds in about 13 fathoms water, over a bottom of sand and mud.

General charts 165, 1800, 1440, 2158a, b, 449.

Plan 182, Syracuse harbour.

Capo Murro di Porco (ancient Longnum prom.), the south-eastern extremity of Penisola della Maddalena (the ancient Plemmyrium prom.), 9 miles east-north-east of Capo Negro, is formed of rocky cliffs nearly perpendicular, about 50 feet above the sea, from the top of which the land rises gradually to the north-west. The cape is clear of danger, and about a cable from it there are from 15 to 20 fathoms water. *See* view, page 557.

LIGHT (*Lat. 37° 0′ N., Long. 15° 20′ E.*). —Near the extremity of Capo Murro di Porco is a white tower, 59 feet in height, which exhibit, at an elevation of 110 feet above the sea, a *flashing white* light *every thirty seconds*, showing a flash for *nine seconds*, followed by an eclipse for *twenty-one seconds*, and is visible in clear weather from a distance of 16 miles. For arc of visibility, *see* Light list.



Capo Murro di Porco lighthouse.

Capo Panagia (Santa Panagia), 6½ miles northward of Capo Murro di Porco, is a bold headland, 217 feet above the sea, fronted by cliffs 45 feet high, on which is the ruin of a house. The cape may be approached to a distance of a quarter of a mile, as no danger exists off it.

Coast. — Between the two capes the coast is generally cliffy, and viewed from sea has a barren, rocky appearance, caused by the absence of trees, but it is in reality well cultivated; nearly midway between, are the town and harbour of Syracuse. From Capo Murro di Porco to Syracuse the coast is steep, and may be approached to a quarter of a mile; thence to Capo Panagia it is less bold than to the southward, with some rocks close to the shore.

Depths off-shore.—Within a mile of the southern, and 1½ miles of the northern cape, there is 100 fathoms, from whence the depths rapidly increase.

SYRACUSE HARBOUR. — The harbour is a semicircular indentation in the coast about 2 miles in length north and south, and a mile east and west, the north part being protected by Isola Ortigia from the heavy sea caused by easterly winds. The entrance is between Castello Maniaci and Punta Castelluccio, which is cliffy, and situated 6½ cables to the southward; off the latter are some rocks and the shoals of Plemmyrium, which narrow the entrance for large vessels.

The shores of the harbour on the south side are generally of slight elevation, being from 20 to 40 feet above the sea, with a salt lake south of Fiume Anapo; but on the north side they are quite flat and bordered with a sandy beach, and rise gradually to an elevation of about 200 feet above the sea, to the site of the ancient Neapolis, with

Plan 182, Syracuse harbour. Var. 7° 20′ W.

its aqueduct, temples, and amphitheatre. Two broken columns, the only remains of the temple of Jupiter Olympus, are seen on entering the harbour, and were formerly used as a leading mark.

From a depth of 8 or 9 fathoms, the water shoals gradually to the shore, the depth of 5 fathoms averaging a distance of 3 cables from the south and west sides of the harbour, and twice that distance from the north part.

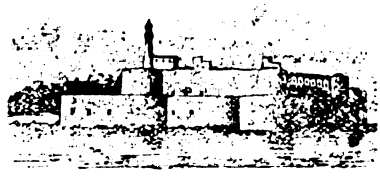
Fiume Anapo flows into the sea on the west side of the harbour, through the alluvial plain, from whose marshes Syracuse derived its name, the miasma from which so often caused the destruction of its besiegers in former days. The marsh is now only partially drained, and in summer malarial fever is prevalent on the west side of the harbour, but the inhabitants of the town are not much affected by it.

About a mile from its mouth Fiume Anapo is joined by Fiume Ciant, and at about 2 miles is the celebrated fountain or spring of Cyane, now named El Pisma, a circular basin of the purest water, though from its muddy bottom it has a black appearance; it is about 60 or 70 feet in diameter and 26 feet deep, and well stocked with fine fish; the banks are covered with a profusion of aquatic plants. Thence it flows in a narrow, limpid, and quiet but deep stream, joining the Anapo at about three-quarters of a mile from the sea. In the valley and between the two rivers, 6 miles north-west of the shore, is the town of Floridia.

La Darsena is formed by the channel north-westward of the town, and is divided by a stone bridge with low arches, which connects the town with the mainland. The northern side of the bridge is only used by small boats in fine weather. On the southern side of the bridge there are depths of $2\frac{3}{4}$ fathoms, decreasing to $2\frac{1}{4}$ fathoms.

Caution.—With winds from E.N.E., East, and sometimes from S.E., in winter, a very violent current runs through La Darsena. Vessels, therefore, are very strongly recommended when these winds blow fresh, especially from E.N.E., to leave the basin and anchor outside.

LIGHTS (*Lat. 37° 3′ N., Long. 15° 18′ E.*).—On the highest part of Castello Maniaci, on the north side of the entrance to the harbour, a white circular tower, 22 feet in height, exhibits, at an elevation of 90 feet above the sea, an *occulting green* light *every seven and a half seconds*, showing thus:—light, *five seconds;* eclipse, *two and*



Castello Maniaci lighthouse.

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Plan 182, Syracuse harbour. Var. 7° 20′ W.

a half seconds; it is visible in clear weather from a distance of 6 miles. For arc of visibility, *see* Light list.

At Punta Castelluccio, on the south side of the entrance, an *occulting red* light *every seven and a half seconds,* showing thus:—light, *five seconds;* eclipse, *two and a half seconds,* is shown, at an elevation of 69 feet above the sea, from an iron crane, 28 feet in height, surmounting a yellow dwelling; it is visible, in clear weather, from a distance of 12 miles. For arc of visibility, *see* Light list.

Two leading lights are exhibited from red and white chequered beacon towers. The front light, named Caderini, is distant about $2\frac{3}{4}$ cables north-westward from Punta Callarine, and exhibits, at an elevation of 40 feet above the sea, an *occulting white* light *every five seconds,* thus:—light, *two and a half seconds;* eclipse, *two and a half seconds;* in clear weather it is visible from a distance of 10 miles. For arc of visibility, *see* Light list.

The rear light, named Carrozzieri, situated 268° true, distant $5\frac{3}{10}$ cables from the front light, is *fixed white,* and shown at an elevation of 83 feet above the sea; it is visible, in clear weather, from a distance of 12 miles. For arc of visibility, *see* Light list.

These lights in line, bearing 268° true, lead in the deepest water through the entrance channel to the harbour.

A *red fixed* electric light is shown at the north-west angle of the pier near the harbour office; two *red fixed* electric lights are shown from lamp-posts, 15 feet in height, near the Pratique office; and three electric *white* lights are shown at the Piazza Mazzini.

Dangers at the entrance.—Scoglio Castelluccio, lying nearly a cable north of Punta Castelluccio, are readily distinguished; they are low and flat, excepting at the north-east end, where there is a remarkable square lump. They are steep-to seaward, but there is no passage between them and the shore.

Scoglio Galera or Egg rock, 4 cables westward of Punta Castelluccio, is small and flat, and lies a cable from the shore.

Plemmyrium shoals (*Lat. 37° 3′ N., Long. 15° 18′ E.*) lie on the north-west side of Punta Castelluccio, and narrow considerably the entrance of the harbour, for large vessels. They consist of two rocky patches, with general depths of from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms over them, the shoalest water, Secca Galera, being $3\frac{1}{4}$ fathoms, from which Castelluccio lighthouse bears 117° true, distant 4 cables.

Dog rock (Scoglio del Cane), lying about 2 cables eastward of the town, is awash, and marked, except in fine weather, by heavy breakers; it is steep-to seaward, but connected to the shore by rocky patches.

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Plan 182, Syracuse harbour. Var. 7° 20′ W.

From Castello Maniaci, at the south end of the town, a rocky bank stretches eastward, with irregular soundings, which should be avoided by vessels of heavy draught. The outer edge of this bank, with $4\frac{3}{4}$ fathoms water, is $3\frac{1}{4}$ cables, eastward, from Maniaci lighthouse. The south and west sides of the point are fringed by shoal ground, which extends a cable from the shore.

To avoid the bank and Scoglio del Cane (Dog rock), when bound into Syracuse, coming from the northward, Castelluccio lighthouse should not be brought to bear less than 195° true until the leading mark for the harbour is on.

Anchorage.—Vessels may anchor where convenient, in 6 to 8 fathoms of water, over stiff, muddy bottom. Vessels drawing 20 feet can go alongside the Custom-house wharf, and those drawing 17 feet alongside the landing wharf.

Directions.—In entering the harbour of Syracuse, Castelluccio lighthouse should not be brought to bear less than 195° true until the two leading light-towers on the west side of the bay are in line bearing 268° true, or St. Joseph's bridge, which is constructed with an iron span, the ends of which rest on conspicuous stone supports built out from either bank of Fiume Anapo, is in line with Monte Grosso, bearing 281° true. *See* view on plan.

The towers in line lead into the harbour, in the deepest water, between Castello Maniaci and Plemmyrium shoals, and when Scoglio Galera bears 167° true the vessel will be inside the shoals, and may steer for the anchorage.

By night, the leading lights exhibited from the beacon towers in line, bearing 268° true, lead in the deepest water of the entrance channel, until Maniaci light bears 28° true, when the anchorage may be steered for.

Caution.—Mariners are warned that great care should be taken not to open the rear leading light (or beacon) to the southward of the front light (or beacon), as the leading line just touches the 10-fathom contour line northward of Plemmyrium shoals.

Town (*Lat. 37° 3′ N., Long. 15° 18′ E.*).—Syracuse (Siracusa, ancient Syracusæ) was founded by a colony from Corinth about 731 B.C., and gradually increased in prosperity, until the circuit of its walls was about 22 English miles, and the population is supposed to have numbered 500,000. The ancient city was of a triangular form, and consisted of five towns: Ortigia, or the islet called Nasos, which was all the Greeks first occupied, after having expelled the Sicilians; Achradina, the handsomest, facing the sea, and northward of Ortigia;

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Plan 182, Syracuse harbour. Var. 7° 20′ W.

Tyche, named after the temple of Tyche, or fortune, and lying north-west of Achradina: Neapolis, south of Tyche; and Epipolæ, the town above the three latter, strongly fortified.

The modern town is wholly confined to that small portion of the site of the ancient city included in the island of Ortigia, separated from the main by a fosse, and projecting south in the shape of a narrow peninsula, forming the east side of the harbour. It has little except its ancient renown, its fine harbour, and the extreme beauty of its situation to recommend it.

It has a cathedral which was formerly the temple of Minerva, several churches, with numerous convents, a college for general studies, a seminary for the clergy, a hospital, a lazaretto, extensive barracks, a museum, and a public library. The streets are narrow and dirty. The island is surrounded by a wall with bastions, and is strongly fortified at its north end by a series of forts, and on its south extremity by the Castello Maniaci. The population in the year 1911 was 40,587. A British Vice-Consul is resident at Syracuse.

Communication. — There is daily communication by steamer with Malta (9 hours), and weekly with Genoa, Tripoli, Tunis, and Palermo, calling at intermediate ports; and by rail with Licata, and Palermo and Messina viâ Catania; the railway station is at the north head of the bay. Telegraphic communication with all lines. The telegraph office is open till midnight.

Submarine telegraph cable. — Two submarine cables connect Syracuse with the Tripoli coast, one to Tripoli, the other to Bengasi.

Coal. — In 1911, 150,000 tons of coal were imported. About 3,000 tons is usually kept in stock, 300 tons can be put on board in 24 hours. There are 12 lighters available, each holding 10 tons. There is a coal wharf, 600 feet long, with a depth of 25 feet alongside.

Supplies of fresh provisions, vegetables, and fruit, may be procured; turkeys are cheap and plentiful; good water may be obtained from five nozzles on the Foro Vittorio Emanuele quay near the Harbour master's office; from 14 to 17 tons can be obtained per hour. Application should be made to Municipal Engineering office for the use of materials and as to payment. There are also three small water tank vessels, which supply water alongside. The water in the Fiume Anapo is not good.

Hospitals.—There is an infirmary with 100, and a civil hospital with 60 beds; the latter receive strangers at a fixed rate.

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Plan 182, Syracuse harbour. Var. 7° 20′ W.

Trade. — The principal exports consist of lemons and oranges, asphalte rock, olive oil, tomato sauce, carobs, almonds, and cereals; and the imports of petroleum, timber, wheat, wine, and coal.

Shipping. — In 1911, 873 steam vessels, with a total tonnage of 887,077 tons entered the port, and 816 sailing vessels, with a total tonnage of 24,304 tons.

Porto Piccolo (ancient Marmoreus) is a shallow bay separating the island, on which is the town, from the mainland. It is suitable only for boats in fine weather, as the sea breaks right across it at other times, particularly in easterly gales.

Punta Spuntone, the northern extreme of the Syracuse bay, is formed of yellowish cliffs, of no great height, and having several winding coves.

Scoglio di Grotto Santa (*Lat. 37° 5′ N., Long. 15° 18′ E.*), or perforated rock, is small, 37 feet above the sea, and lies nearly midway between Capo Panagia and the north end of Syracuse. It is three-quarters of a cable from the shore, and has a hole through its base; on it is a small black cross, which can only be seen a short distance.

Chart 187, Palma to Catania.

Monte Fiopriolo. — About 5 miles inland of Capo Panagia a remarkable mountain range, from 1,100 to 1,500 feet above the sea, named Fiopriolo, will be seen rising from the plains of Syracuse, and stretching in a north-west direction. Between the Penisola Magnisi and Augusta, this range is about 2½ miles from the coast and parallel to it, descending precipitously to about 400 feet high, and thence gradually, to the sea; on the fall to the north is the town of Melleli with its churches, elevated 1,200 feet above the sea. *See* view on plan 181.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from the shore one mile westward of Capo Panagia; they extend north-eastward about 4 cables, and the outer end is marked with a floating beacon surmounted by a white pole by day and a *white* light by night. *See* also Caution, page 73.

Coast. — Capo Santa Croce is about 8½ miles northward of Capo Panagia, the coast between forming two bays, which are separated by the Penisola Magnisi; the southern bay is named Panagia, and at the north end of the northern is the town and port of Augusta.

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Plan 181, Port Augusta.

Magnisi, the ancient peninsula of Thapsus, is about 3½ miles north-westward of Capo Panagia, from the cliffs of which it curves northward and westward; it is a little over a mile in length in a north-north-west and south-south-east direction, less than half a mile in breadth, 90 feet above the sea, and connected to the main island by an isthmus or narrow neck of sand.

LIGHT (*Lat. 37° 9′ N., Long. 15° 14′ E.*). — On the north-east point of Penisola Magnisi, an *occulting white* light *every twenty seconds*, showing thus, light *ten seconds*, eclipse *ten seconds*, is exhibited, at an elevation of 48 feet above the sea, from a white circular tower 31 feet in height, and with a white dwelling attached; in clear weather it is visible from a distance of 12 miles. For arc of visibility, *see* Light list.

Pensiola Magnisi lighthouse.

Secca Magnisi, having depths of from 3¼ to 5 fathoms over it, extends half a mile north-eastward of the lighthouse; the south end of Monte Fiopriolo, touching Punta Tuano, the north-west end of Penisola Magnisi, bearing 224° true, leads westward of the spit.

Priolo.—The village of Priolo is situated about half a mile from the shore of the bay westward of Penisola Magnisi, and south of Fiumara del Fico, and on the south side of the bay are large saltworks, nearly half a mile southward of which is a monument, named Aguglia, erected by Marcellus, consisting of a square pedestal surmounted by a round column, which has been thrown down; the remains are about 30 feet high.

Dangers.—The shores of the bay on the western side of Penisola Magnisi are fringed by a shallow bank which in some parts extends nearly half a mile seaward. Secca Salina, with 16 feet water over it, lies 4½ cables westward from Punta Tuano, and nearly the same distance from the shore.

Secca Vognoli, of small extent, with a depth of 16 feet over it, lies 4 cables south-eastward from Punta Vognoli.

Communication. — There is a railway station on the line between Syracuse and Messina at Priolo, and telegraphic communication at limited hours.

Capo Santa Croce, 5 miles north-north-east of Magnisi, is low, and close off it is a little islet or rock, named Stoneddo, 2 feet high; the cape is bordered with shallow water, which extends 1½ cables off, and it should not be approached nearer than a third of a mile.

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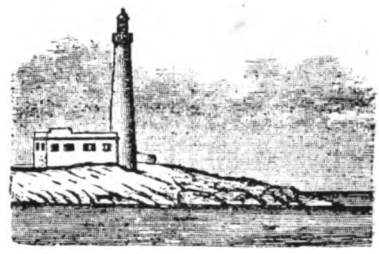
Plan 181, Port Augusta. Var. 7° 20′ W.

LIGHT. — From a white circular tower, 89 feet high, with a dwelling attached on Capo Santa Croce, is exhibited, at an elevation of 96 feet above the sea, an *occulting white* light *every fifteen seconds*, thus:—light, *ten seconds;* eclipse, *five seconds;* it is visible in clear weather from a distance of 15 miles. For arc of visibility, *see* Light list and plan.



Capo Santa Croce lighthouse.

Coast. — Punta Sant' Elia, 6 cables south-south-westward of Capo Santa Croce, is 103 feet above the sea, and from this the coast turns to the westward for 4 cables to Punta Izzo.

From Punta Izzo the coast takes a sharp turn to the north-west, forming the south-west side of a promontory of which Capo Santa Croce is the eastern extreme. Between the promontory and Augusta is a shallow rocky bay, named Porto Xifonica, which terminates at its head in extensive salterns.

PORTO DI AUGUSTA (*Lat. 37° 12′ N., Long. 15° 13′ E.*). —The port of Augusta, which is formed westward of Isolotto Avolos, is secure and spacious, capable of receiving a large number of vessels, in 8 to 11 fathoms water. In its north-west part are two old forts, close together, on an islet, the western and larger one named Garzia, and the smaller Vittoria. At the northern end is Mulino Garilli, a conspicuous mill painted with two horizontal black bands on a white ground, and a small vertical white band. The west side of the harbour is watered by several streams, in which eels, mullet, and barbel are caught, and the country is more or less covered with olive trees and cultivation.

Isolotto Avolos, about 1¼ miles in length, is narrow, lying nearly north and south, its citadel is connected to the low shore on the north by a bridge, under which is a passage for boats. The western side of the island is fringed by a chain of rocks, just covered at low water.

Cala del Molo is a small basin on the north-west side of Isolotto Avolos. It has been dredged in most parts to a depth of 12 feet, and affords excellent protection for small vessels except with strong northerly winds. The pratique and Harbour master's office is at its north end.

Torre Avolos.—Torre Avolos, an insulated fort, stands about 3 cables southward of the south end of the island; the water between being from one to 2 feet deep.

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Plan 181, Port Augusta. Var. 7° 20′ W.

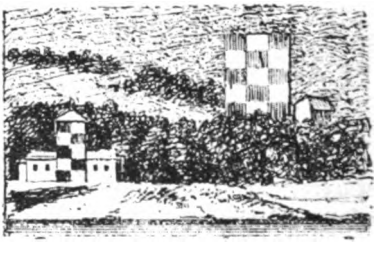
Punta Cantara is nearly 2 miles westward of Torre Avolos, and about that distance north-north-eastward from Punta Vognoli, the coast being formed of hillocks, with some small streams running into the sea; the mouth of the Fiume Cantara is about 2 cables north-westward of that point.

Un Dromo. — At $1\frac{6}{10}$ miles westward of Punta Cantara is a beacon, constructed of masonry, 24 feet wide, 39 feet high, and painted red and white in squares; the beacon, kept in line with Cantara lighthouse, bearing 282° true, is the leading mark for entering the port, between the shoals, by day. *See* view on plan.

LIGHTS. — Torre Avolos (*Lat. 37° 13′ N., Long. 15° 14′ E.*). —At the north-east part of Torre Avolos is a white circular tower 58 feet in height, which exhibits, at an elevation of 90 feet above the sea, an *occulting white* light *every thirty seconds*, thus: — light, *twenty seconds;* eclipse, *ten seconds:* it is visible in clear weather from a distance of 12 miles. For arc of visibility, *see* Light list.

Torre Avolos lighthouse.

Punta Cantara. — On Punta Cantara, a turret, 7 feet in height, with red and white squares, exhibits, at an elevation of 42 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 11 miles over an arc of 9°, which comprises the clear passage between Torre Avolos and Hybla shoals.



Punta Cantara lighthouse. Un Dromo beacon.

Dromo.—In front of Un Dromo, is exhibited, at an elevation of 158 feet above the sea, a *fixed* and *occulting red* and *white* light: it is visible in clear weather from a distance of 14 miles. This light, in line with Cantara light, bearing 282° true, leads midway between Torre Avolos and Hybla shoals. For sectors and arc of visibility, *see* Light list and plan.

Cala del Molo. — From an iron lamp-post, erected on the northern mole of the basin, is exhibited an *occulting red* light *every five seconds;* showing thus:—light, *three seconds;* eclipse, *two seconds.*

General charts 187, 165, 1800, 1440, 2158a, b, 449.

Plan 181, Port Augusta. Var. 7° 20′ W.

From an iron lamp-post, erected on the southern mole of the basin, is exhibited an *occulting green* light *every five seconds*, showing thus: —light, *three seconds;* eclipse, *two seconds.*

These lights are elevated 16 feet above the sea, and visible in clear weather from a distance of 5 miles. For arc of visibility, *see* Light list and plan.

Pier.—About 3 cables southward of the entrance to Cala del Molo is a pier about 150 feet long, with a depth of 18 feet at its extreme.

Dangers at the entrance.—Secche di Torre Avolos are rocky, with from one fathom to $3\frac{3}{4}$ fathoms water over them, and to the 5-fathoms line, extend $6\frac{1}{2}$ cables, south-south-eastward, from Torre Avolos; the sea breaks heavily on these shoals in bad weather.

Light-buoy. — The outer extremity is marked by a black light-buoy exhibiting a *flashing green* light *every three seconds*, thus: — flash, *three-tenths of a second;* eclipse, *two and seven-tenths seconds.*

Hybla shoal (Secca di Mezzo or d'Ibla), with from $3\frac{3}{4}$ to 5 fathoms water over it, is 4 cables in length in an east and west direction, and 2 cables in breadth; the sun breaks heavily on it in bad weather. The shoal lies nearly in line, and in the middle of the channel between Torre Avolos and Magnisi lighthouses, but rather nearer the former.

Secca di Coruzzone, nearly midway between Hybla shoal and Punta Vognoli, has depths of from $4\frac{1}{4}$ to $4\frac{3}{4}$ fathoms, over rocky bottom, and on which the sea also breaks in bad weather. Within the depth of 5 fathoms this shoal is about a third of a mile in length in a north-easterly and south-westerly directions, and 2 cables in breadth.

Secca Panaro (*Lat. 37° 10′ N., Long. 15° 14′ E.*), having a depth of 4 fathoms, over rocky bottom, is about half a cable in extent, and lies about a third of a mile eastward of Punta Genarena.

Secca Dreara or Inflexible shoal, on which H.M.S. *Inflexible* touched in the year 1883, is situated in the western part of Porto di Augusta, and has a depth of 4 fathoms. It is about two-thirds of a cable in diameter, is of hard bottom covered with a layer of mud, and has a depth of 5 fathoms close around. From the shoal Torre Avolos lighthouse bears 103° true, distant $1\frac{2}{10}$ miles.

Macchia di San Guiseppe, a shoal of 4 fathoms, about three-quarters of a cable in extent, is situated about 2 cables west-north-westward of the citadel at the north end of the town.

Directions. — A vessel from the southward, bound to Porto di Augusta, should give Penisola Magnisi a berth of over half a mile,

Plan 181, Port Augusta. Var. 7° 20′ W.

taking care to keep the lighthouse on Capo Santa Croce well open eastward of Punta Sant' Elia, bearing 0° true. When northward of Secca Magnisi the lighthouse may be kept just touching Punta Sant' Elia, 10° true, until Punta Cantara lighthouse and Dromo beacon light (before mentioned) are in line bearing 282° true; keeping on this leading mark will lead equidistant from Avolos and Hybla shoals, and when the south-west bastion at the town is seen in direction of coast-line, bearing 0° true, steer northward for the anchorage, in depths of 9 or 10 fathoms, abreast the town. On Punta Pila is a conspicuous yellow house close to the railway; this house, seen between Forti Vittoria and Garzia, bearing 345° true, leads up the centre of the harbour.

From the northward, after passing Punta Sant' Elia, keep Santa Croce lighthouse touching Punta Sant' Elia, until Cantara lighthouse and the beacon are in line, then steer as before. With easterly and southerly gales there is often much swell, which causes vessels lying far out to ride uneasily. The bottom is so stiff as to render it necessary at times to break the anchor out of the ground.

Tides. — It is high water, full and change, in Porto di Augusta, about IIIh. 20m., but the tides are irregular. The rise and fall is much affected by the wind, and varies from 4 to 15 inches.

Tidal streams. — Off Capo Santa Croce, the current, though influenced by the wind to some extent, appears to be tidal, generally running to the northward whilst the water is rising, and to the southward whilst it is falling, and changing from one to two hours after the tide.

Town (*Lat. 37° 13′ N., Long. 15° 14′ E.*).—The town of Augusta, ancient Xiphonia, stands on the island of Avolos; it was built in the 13th century, and until devastated by the earthquake of 1693, was a place of considerable importance. The streets are regular and parallel, but the houses are small and mean; it has a cathedral and other public buildings. The town is strongly fortified, and contains a population of about 15,000, partly agricultural and partly commercial.

Communication.—Railway communication with Syracuse and Messina, the station being on the main island, about half a mile northward of the citadel; telegraphic communication at limited hours.

Coal and supplies. — The Italian Government keep a large stock of Welsh coal, but exclusively for the use of the Italian vessels of war. A private firm keeps about 2,500 tons of Welsh coal in a coal hulk. There are two coal wharves, one 300 feet in length, with a depth of 18½ feet alongside at low water, the other 150 feet with a depth of 18 feet alongside at low water; 600 tons can be loaded in 24 hours.

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Plan 181, Port Augusta. Var. 7° 20′ W.

Supplies of fresh meat, bread, and vegetables may be procured, and are plentiful; beef and vegetables are very good; bread only fair in quality. Abundance of good water may be obtained from a steam tank on application to the Harbour Master.

Landing.—The landing pier is about 300 yards south-west of the cathedral.

Trade.—Salt constitutes the principal article of commerce; there is a factory for making citrate of lime, and essential oil of lemons.

Capo Campolato.—From Punta Sant' Elia the land gradually rises to 286 feet, forming a ridge to the north-west, which terminates near Capo Campolato (58 feet high) in a sudden dip. From this ridge, which is a long half mile from the coast, the land slopes towards the sea, and is partially wooded with olive trees, interspersed with vineyards and cultivated patches.

Porto Bruccoli. — About half a mile westward of Capo Campolato is Punta Tonnara, from whence the shore turns southward and forms, with Punta Bonico, one mile to the westward, Porto Bruccoli, a small bay about half a mile deep. At the head of the bay, and on a rocky projection, is a small village with a square castle on its extremity. This little bay appears like a work of art rather than of nature, as the rocks rise vertically 40 or 50 feet, and contain several grottoes. Small vessels resort hither for wheat, tunny, and stones for building. Fine oysters are obtained here; a rivulet runs into the bay, near which is also a mineral spring.

LIGHT (*Lat. 37° 17′ N., Long. 15° 12′ E.*). — About 1½ cables south-east of the castle, in Porto Bruccoli, from a yellow turret on a yellow one-storeyed building, is exhibited, at an elevation of 41 feet above the sea, an *occulting white* light *every five seconds*, thus:—light, *three and a half seconds;* eclipse, *one and a half seconds*. The light is visible in clear weather from a distance of 10 miles.

Anchorage.—The anchorage is about 2 cables north-eastward of the castle in a depth of 9 fathoms.

Chart 187, Palma to Catania.

CATANIA BAY may be considered to be included between Capo Campolato and Capo Molini, bearing north and south from each other, and 17 miles apart; the depth of the bay is about 5 miles, the shore presenting a long line of low sandhills as far as the lighthouse of Catania. From Catania the coast is generally composed of black lava. In the centre is the great plain of Catania or Lentini bounded north and south by the Fiume Giaretta and its tributaries; the city of Catania lies at the north-west head, at the foot of Mount Ætna.

General charts 165, 1800, 1440, 2158a, b, 449.

Chart 187, Palma to Catania. Var. 7° 20′ W.

Depths off-shore. — There is a depth of 10 fathoms within 1½ miles of the beach, at 4 miles, above 100 fathoms, and at 12 miles off above 1,000; the bottom is of mud, except close inshore.

Coast. — From the Scaro di l'Agnuni, 5 miles west-north-west of Capo Campolato, the sandy beach, backed by low sandhills, trends northward about 11 miles to the lighthouse of Catania, which is white and conspicuous, and stands on the black lava point, formed by the eruption of Mount Ætna in the year 1669. The slopes of the mountain are wooded and well cultivated, studded with villages and detached dwellings, and winding a little within the coast is the railway to Messina. This part of the coast is generally composed of black lava from 15 to 30 feet high, rising in ridges towards Mount Ætna.

Fiume Simeto, which rises on the western slopes of Mount Ætna, after a course of about 40 miles, through rich cultivated land, runs into the sea, about 5 miles southward of Catania. Its mouth is almost closed at the end of the summer, when the banks of the bar become dry, and the depth for 1½ miles within, at the lowest stage, varies from 2 to 6 feet; but after heavy rains the river overflows its banks a mile within the bar. It has been said that fine specimens of yellow, red, and black amber have been collected floating at its mouth.

Plan of Catania on 190.

CATANIA HARBOURS.—Porto Vecchio (*Lat. 37° 30′ N., Long. 15° 6′ E.*). — The old port of Catania is formed by a mole extending from a point of black lava, thrown into the sea during an eruption. The mole extends southward, 250 yards, then south-westward, 130 yards, leaving an entrance about 270 yards wide, but narrowed to about a cable by shoal ground fringing the shore. Within is another mole of more ancient construction, forming a basin, La Darsena.

Within Porto Vecchio vessels moor with their sterns to the mole and heads to the westward, sufficiently protected in ordinary weather, though not in the heavy north-east gales which occur during the winter. The port being small, and generally filled with small vessels, it is advisable, before dropping the anchor, to ascertain the position of the moorings, and the anchors of other vessels.

Porto Nuovo and **L'Avamporto** are formed by a breakwater, Molo Esterno, which, extending from the shore about 2 cables eastward of the old mole, extends first in a south-south-easterly direction, then south, and lastly south-westerly, and has a total length of 1,460 yards; the head of the breakwater, for a distance of about 25 yards, is painted white to render it more conspicuous against the background of lava. About 400 yards from the root of the breakwater two short arms about 250 feet long extend at right angles

Plan of Catania on 190. Var. 7° 20′ W.

from the mole and breakwater, forming a hexagonal basin named Porto Nuovo. The remainder of the space between the breakwater and the shore of Punta Sciara Biscari is called l'Avamporto. The bottom is silting along the inner side of the breakwater.

A new breakwater, westward of the head of Molo Esterno, to protect the port from south-easterly winds, was commenced in 1912; when completed it will extend about 275 yards from the coast. The outer end is marked by a buoy, which should be left on the port hand by vessels entering.

Depths.—There is a depth of 5 to 8 fathoms in the entrance to the harbour; 4 to 8 fathoms in l'Avamporto; 3¼ to 8 fathoms in Porto Nuovo, and 20 to 23 feet alongside the quays; 22 to 27 feet in Porto Vecchio, and 20 to 23 feet near the quays; 7 to 10 feet in the middle of La Darsena.

Shoal. — A shoal with about 3 feet over it, formed by fragments from the mole, lies about 10 yards from the inner part of the east mole, and about 120 yards from the south angle of the root of the transverse mole.

LIGHTS. — Punta Sciara Biscari (*Lat. 37° 30′ N., Long. 15° 6′ E.*). — The principal lighthouse at Catania is a white circular tower, 53 feet in height, with dwelling adjoining, and stands upon Punta Sciara Biscari, a quarter of a mile to the south-west of the molehead of the old port; it exhibits, at an elevation of 96 feet above the sea, a *fixed* and *flashing white* light *every minute*, thus:—fixed, *thirty-five seconds;* partial eclipse, *ten seconds;* flash, *five seconds;* partial eclipse, *ten seconds;* in clear weather it is visible from a distance of 11 miles. (Reported not visible so far, and difficult to distinguish from the town lights.)

Punta Sciara Biscari lighthouse.

Molo Esterno. — An *occulting green* light *every five seconds*, thus:—light, *three seconds;* eclipse, *two seconds*, is shown, at an elevation of 49 feet above the sea, from a grey iron turret, 29 feet in height, and standing on the extremity of the Molo Esterno; it is visible in clear weather from a distance of 12 miles.

Porto Vecchio. — About 33 yards from the extremity of the mole on the eastern side of the entrance to Porto Vecchio, an iron crane on a light red edifice, 26 feet in height, exhibits, at an elevation of 36 feet above the sea, a *fixed white* light, which in clear weather is visible from a distance of 4 miles, but is obscured in a sector to the eastward by the new mole.

Porto Nuovo. — On the end of the mole on the western side of the entrance to Porto Nuovo, a *fixed red* light is exhibited, at an elevation of 27 feet above the sea, from a grey iron support, 21 feet high; it is visible in clear weather from a distance of 3 miles.

General charts 187, 188, 165, 1800, 1440, 2158a, b, 449.

Plan of Catania on 190. Var. 7° 20′ W.

Darsena.—On the extremity of the mole on the eastern side of the entrance to La Darsena, a *fixed green* light is shown, at an elevation of 17 feet above the sea, from a white tower 14 feet in height; it is visible in clear weather from a distance of one mile.

Two *fixed red* lights, placed vertically, at elevations of 13 and 10 feet, respectively, above the sea, as shown at the harbour office landing place.

The electric lights in the town are liable to be mistaken for the harbour lights from seaward.

Buoys. — A white mooring buoy, marked "Catania," and the depth of water it is lying in, in metres, painted in black letters, lies on the west side of the entrance to Porto Vecchio; two similar buoys lie in Porto Nuovo, and one similar buoy in Avamporto bearing 49° true, distant 3 cables from Sciara Biscari lighthouse.

A red cylindrical buoy lies on the eastern side of the entrance to Porto Vecchio.

Pilots. — In ordinary weather pilots are chiefly useful for their knowledge of the many obstructions in the old and new port, and also the positions of the moorings, as well as of the anchors of the vessels there. Pilots will be embarked and discharged one mile outside Molo Esterno.

The rates of pilotage are as follows: —

1. For every ton, net registered measurement, 8 centisimi, with a minimum of 15 lire and a maximum of 80 lire.

2. Fixed fee of 30 lire for vessels of any tonnage belonging to lines which regularly visit the port (at least twelve times a year).

3. The rate will be calculated on the tonnage as for anchorage dues.

Anchorage (*Lat. 37° 30′ N., Long. 15° 7′ E.*). — Temporary anchorage may be obtained in 11 fathoms water, over mud, half a mile southward of the outer breakwater, with Sciara Biscari lighthouse bearing about 315° true. This, however, is a dangerous anchorage during winter, and should be quitted immediately there is a sign of a gale from the northward and eastward.

Directions. — Approaching Catania from the southward the coast may be approached anywhere to the distance of a mile or until the breakwater lighthouse or light is sighted. If from the northward, after passing the Cyclops, vessels may steer to pass about half a mile southward of the breakwater lighthouse, and rounding the end of the breakwater, into Avamporto, leaving the buoy marking the breakwater constructing on the port hand.

Tides. — It is high water, full and change, at L'Ognina, 2 miles north-eastward of Catania, at about IIIh. 25m., and the rise is from 3 to 12 inches. The times of high and low water are, however, irregular, being influenced by the force and direction of the winds.

Tidal streams. — From Catania to Capo Molini, in calm weather, there is a regular easterly and westerly stream of about half

Plan of Catania on 190. Var. 7° 20′ W.

a knot an hour, which turns about half an hour after and 6 hours before high water at L'Ognina, but in general the stream sets in the direction of the wind.

City (*Lat. 37° 30′ N., Long. 15° 6′ E.*).—This celebrated city (the ancient Catana), founded B.C. 732 by Naxos, stands at the foot of one of the ridges from Mount Ætna, about 14½ miles southward of the mount, and at the extremity of an extensive plain. It has suffered much at different times by wars, earthquakes, and volcanic eruptions; by an earthquake in 1693, it was all but totally destroyed and 50,000 inhabitants perished; overwhelmed as it has often been by torrents of liquid fire, it has always risen from its ruins.

Catania has a noble appearance from seaward, and the effect is not diminished on landing, for its streets are regular, spacious, and handsome; and the numerous churches (four having conspicuous cupola towers), convents, palaces, and public establishments, principally constructed of lava, faced with magnesian limestone and enriched with marbles, are magnificent; the city is lit by electricity.

The streets are paved with lava, houses are built of it, ornamental chimney-pieces, tables, and a variety of other things, are made of lava, and also the moles in the harbour.

The environs are well cultivated and fruitful, and in the year 1911 the city contained 211,699 inhabitants. A British Vice-Consul is resident. At 2½ miles west is the town of Misterbianca.

Communication. — Weekly steamers to Genoa, Tripoli, Palermo, Brindisi, Fiume, Marseille, and Venice; fortnightly to Odessa; monthly to London, Liverpool, Amsterdam, Hamburg, Hull, New York, Venice, Batum, Calcutta, and Montreal. By railway with Palermo, Syracuse, Messina, also a railway round the base of Mount Ætna to Riposto; and by telegraph with all lines. The telegraph office is always open. Electric tramways run in the streets, and a line is being constructed to Acireale.

Coal and supplies. — About 7,000 tons of coal are kept in stock, and about 400 tons could be put on board in 24 hours. There are 25 lighters holding from 25 to 30 tons, and, by giving notice, from 200 to 250 tons could be ready loaded in lighters; there is a coal wharf 950 feet long, with a depth of 25 feet alongside; S.E. winds may impede or prevent coaling.

Supplies of fresh meat, vegetables, and bread, may be procured, and excellent water is brought off in harbour tanks.

Repairs. — Medium repairs to machinery can be effected, and there are three machine shops for small repairs; a crane will lift 5 tons. Two divers may be obtained.

General charts 187, 188, 165, 1800, 1440, 2158a, b, 449.

Plan of Catania on 190. Var. 7° 20′ W.

Hospital. — The hospital Vittorio Emanuel, with 120 beds, receives strangers at a fixed charge.

Time signal. — From the roof of the Observatory (Convent of the Benedictines) a black ball is dropped at 23h. 0m. 0s. Greenwich mean time, corresponding to noon, Mid-European time; the ball is hoisted 3 minutes before the signal is made, and a gun fired simultaneously with the dropping of the ball, which is only hoisted a short distance above the buildings and requires a glass to distinguish it.

Trade. — There is an important factory for the production of bi-sulphide of carbon, and two factories for the extraction of sulphide of olive oil. The principal exports, consist of sulphur, green and dry fruits, oranges and lemons, wine, and oil; and imports of cereals and vegetable produce, coals, hides and skins, iron and metals, timber and furniture. During 1911, 140,000 tons of coal were imported (the average quantity imported annually being 141,000 tons).

Shipping.—In 1911, 1,942 steam vessels, with a total tonnage of 2,258,376 tons, entered the port, and 1,386 sailing vessels, with a total tonange of 64,261 tons.

Chart 188, Catania to Cefalu.

MOUNT ÆTNA (*Lat. 37° 45′ N., Long. 15° 0′ E.*).—The coast between Catania and the Fiume Alcantera, 19½ miles to the north-east, forms the eastern limit of the base of Mount Ætna. This celebrated mountain is bounded on the north by the Alcantera, on the south and west by the Giaretta, and is considered to be about 87 miles in circumference; its summit, 10,880 feet above the sea, lies 15 miles northward of Catania.

The length of the ascent varies on different sides of the mountain; that from Catania being about 24 miles, from Linguaglossa 18 miles, and from Randazzo scarcely 12 miles. Numerous villages, monasteries, and dwellings surround its base, having in all a population of about 180,000.

Randazzo, on the northern foot, is a battlemented town, with three churches, and to the westward of it is a lake 2 miles in length. The extent of the base of Mount Ætna gives generally so easy an inclination to the sides as greatly to facilitate the ascent; but at the same time it diminishes the grandeur of its aspect at first sight, and its commanding elevation is scarcely perceived until the traveller has accomplished half the ascent, when, with Sicily lying at his feet, the summit still appears as far off as at first.

The mountain is divided by nature into three regions or zones, viz., the fertile, the woody, and the desert, to these may be added the fiery region, consisting of the central cone and crater.

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Chart 188, Catania to Cefalu. Var. 7° 20′ W.

The lower or fertile zone varies greatly in width, being 11 miles broad above Catania, but only 1½ miles on the north side; it is composed almost entirely of lava which, in the course of ages, has pulverised and become converted into a very fertile soil.

The woody region begins and terminates abruptly, is 6 or 7 miles in width, and reaches an elevation of about 6,400 feet; the greater part of the ground is covered with ferns and aromatic plants. In the lower parts, the trees are principally oak and chestnut; in the middle they are almost entirely oak, some of them attaining an immense size; in the upper part the oaks decrease in size, and are intermixed with pines; as the mountain is ascended the oaks gradually disappear, the firs become stunted, until finally all vegetation ceases, and the desert is entered.

The desert region is a dismal tract, forming an irregular plain about 9 miles in circumference, full of gloomy and rocky hollows and immense chasms, formed of black lava, scoriæ, ashes, and volcanic sand, covered for the greater part of the year with snow, while ice is always found in the hollows.

In the midst of this gloomy region the great cone, at the summit of which is the principal crater, rises to the height of about 1,100 feet above the plain; it is very precipitous, and as it consists of loose scoriæ and ashes, which frequently yield under foot, the ascent is extremely laborious. The bottom of the crater is apparently flat, and tolerably hard.

The ground round the crater is so hot that visitors are obliged constantly to shift their places, and yet even here snow is seen in immense ridges. The view from the summit, on a clear day, is superb beyond description. Sicily is spread out like a map, and every river is traceable; the Faro of Messina, the Calabrian coast, and the Lipari islands are distinguishing features in this magnificent panorama, which at times extends to Vesuvius on the north, and Malta on the south.

The first recorded eruption of Ætna was in 475 B.C., the last on January 31st, 1865.

Plan of Catania on 190.

L'Ognina (*Lat. 37° 32′ N., Long. 15° 7′ E.*). — The village and cove of L'Ognina are rather more than 2 miles northward of Catania. There are from 3 to 10 fathoms water in the cove, from which a great quantity of squared lava is annually shipped for building purposes. Off the south side of the north entrance point is Secca Vicenzo, on which the depth is 7 fathoms, over rock, with 10 to 13 fathoms inside, and a rock, with one fathom water over it, lies

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Plan of Catania on 190. Var. 7° 20′ W.

rather less than half a cable from the shore of the south point of Cala di San Giovanni, about 1½ miles to the north-east of Catania lighthouse.

Water, in small quantity, may be obtained from a public fountain.

Chart 188, Catania to Cefalu.

Aci Castello.—At 2 miles beyond L'Ognina is the little town of Aci Castello and the ruins of a castle, on an enormous cliff of lava, rising vertically from the sea. The town is irregular and dirty, but with its castle is extremely picturesque in appearance.

Capo Molini (*Lat. 37° 35′ N., Long. 15° 11′ E.*), about 2 miles to the north-east of the town of Aci Castello, is a remarkable promontory of lava, with a square tower on it, named Torre Santa Anna. On the north side of the cape is the village of Santa Anna, and on its south side the little bay and village of Molini; midway between the latter and Aci Castello is the loading place of Aci Trezza, a small town built entirely of lava, the dark hue of which, contrasted with the whitewashed lintels and doorposts of the houses, has a singular appearance. On the northern side of the cape are many rocks.

Cyclops (I Ciclopi). — Directly in front of the town of Aci Trezza, about a mile to the south-west of Capo Molini, and less than a third of a mile from the shore, are the Cyclops (the Cyclopum Scopuli of the ancients), four small islets having a bold and singular appearance. The largest and nearest to the cape is flat, and about 82 feet high, the others are pinnacles 142, 92, and 66 feet, respectively, above the sea; the two western are nearly connected by rocks to the shore.

About a quarter of a mile west of the westernmost pinnacle, and half a cable from the shore, is a rock awash, with 7 fathoms water close outside it.

Anchorage.—In Baia Aci Trezza, formed between Cyclops rocks and Capo Molini, anchorage may be taken up under favourable circumstances; the water is deep, and the bay is open to the eastward, but some protection is afforded from the north-east by the point. A large vessel can anchor in 20 fathoms water about 3 cables from the beach, which is composed of large black stones, the bottom is dark, coarse sand. A current is here experienced running at times three-quarters of a knot an hour, but without any regularity. Vessels should leave the anchorage when thick clouds hang about Mount Ætna, as it is considered a sign of a breeze from seaward.

Aci Reale. — A short distance north of Torre Santa Anna, on Capo Molini, the cliffs suddenly gain in height, and at Aci Reale they

General charts 165, 1800, 1440, 2158a, b, 449.

Chart 188, Catania to Cefalu. Var. 7° 20′ W.

are 600 feet above the sea; here the ridge of cliffs and the coastline separate, the former turning a little to the westward, and the latter trending to the north-east.

The town of Aci Reale, containing a population of 35,126 in 1909, stands on a steep mass of basaltic lava; it is in a healthy situation, clean, and regularly built, with a castle, several churches, convents, and other public buildings; it has manufactures of silks, linen, cutlery, &c.: and the exports are wine, cotton, flax, and diaper. The port is small, the mole being formed of lava, and a road supported on arches leads up to the town: it is celebrated for its mineral springs, caves, and grottoes.

Shoal.—A shoal with 2½ fathoms over it lies about three-quarters of a mile southward of Aci Reale landing place, and about a quarter of a mile from the shore.

Communication by railway with Catania and Messina, also by telegraph. The telegraph office is open till 9 p.m.

Supplies of fresh provisions may be procured.

Plan of Riposto on 188.

RIPOSTO. — About 10 miles northward of Capo Molini are the modern towns of Riposto and Giarre; the first, situated on the coast, has a small fort and a population of about 10,000; the latter town, almost adjoining the former, is immediately inland of it. This district produces the finest grapes in the island.

LIGHTS (*Lat. 37° 44′ N., Long. 15° 13′ E.*). — A *fixed white* light is exhibited, at an elevation of 36 feet above the sea, from a small tower, 19 feet in height, surmounting a white building, situated on a point locally known as Chiancona, southward of the town; the light is visible in clear weather from a distance of 8 miles. For arc of visibility, *see* Light list.

A *red* electric light marks the outer end of the mole under construction.

Mole.—A mole about 120 yards long is under construction.

Mooring buoy. — A white iron mooring buoy, with "Genio Civile Catania" in black letters on it, lies in 28 fathoms about 4 cables from the shore.

Anchorage may be obtained off the town, but only in fine weather.

Communication. — A line of steamers between Catania and Messina call here; there is also communication with Genoa, Odessa, Venice, Marseille, and Trieste. There is railway communication with Catania, Syracuse, and Messina. Telegraph communication with all parts; the telegraph office is open till midnight.

Supplies of fresh provisions may be procured in abundance, but the water is only fair in quality.

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Chart 188, Catania to Cefalu. Var. 7° 20′ W.

Coast.—From Riposto the coast trends in a north-easterly direction, for 6 miles, to Capo Schiso, and on this stretch of coast several streams enter the sea; about midway the Fiume Freddo, a perennial stream, deep and clear, rushing from several springs situated at about 1½ miles from the coast, differs in this respect from the other streams, which, like the Alcantera and Minissale, are dry beds in summer.

Anchorage.—During fine weather temporary anchorage may be found anywhere along the shore between Riposto and Capo Schiso.

Fiume Alcantera.—The Alcantera (ancient Onabala) flows in an easterly and south-easterly direction for about 50 miles round the north slopes of Ætna, and enters the sea in a sandy bay about 5 miles from Riposto; in the summer it is nearly dry, but with the melting snows from the mountain it becomes a rapid torrent of considerable dimensions. There are several villages adjacent, including the town of Randazzo already mentioned, about 16 miles from the coast. North of the river are the steep slopes of the Pelorean or Neptunian range, extending the whole length of the island.

Plan of Taormina road on 180.

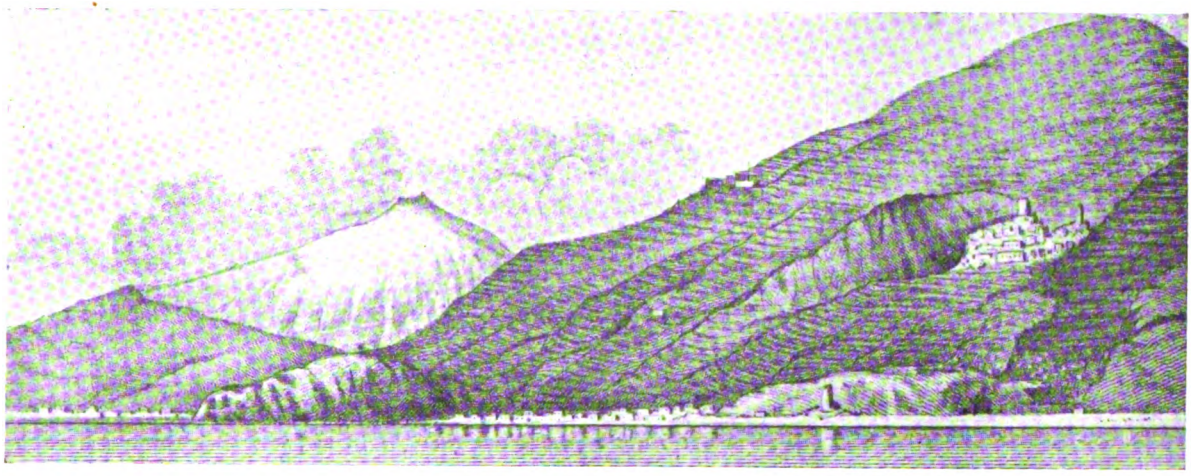
Capo Schiso is low and black, and was formed by one of the earliest and longest streams of lava known; on it is an old castle and other ruins; it is also the site of the ancient town of Naxos, one of the earliest Greek settlements in Sicily. The point is skirted by rocks, and inside, immediately opposite the ruined castle, is a nook where landing can always be effected.

BAIA DI TAORMINA (*Lat. 37° 50′ N., Long. 15° 18′ E.*), between Capo Schiso and Capo Taormina, 1½ miles apart, is about 6 cables deep, and affords tolerable summer anchorage in from 8 to 30 fathoms water, over fine sandy bottom near the shore, and mud further out, but it is exposed to all easterly winds. On the shore in the middle of the bay is the village of Giardini, and south-west of it the marble statue of Santa Pancrazio, now hidden from seaward by houses. The line of railway to Messina skirts the bay, and passes close behind the village.

Anchorage.—The best berth in the bay is in the southern part, in 10 fathoms water, with Capo Schiso, bearing 187° true, distant 4½ cables.

Secca Tremiti, having 7 feet water over it, lies 1½ cables from the shore, and 5½ cables northward of Castello Schiso, or about a quarter of a mile from the berth recommended; there is a depth of 3 fathoms close seaward of the rock. The shores of the bay are skirted by rocky and foul ground, which in some parts extend nearly 2 cables seaward.

General charts 165, 1800, 1440, 2158a, b, 449.



Nisi. *Punta Grosso (Capo d'Ali).* *Mount Aetna.* *Scaletta.* *Tower.*

Plan of Taormina road, 180. Var. 7° 20′ W.

Town. — The town of Taormina (ancient Tauromenium), with about 3,000 inhabitants, is situated on broken elevated ground faced by steep cliffs, 565 feet above the sea, at the north head of the bay. Partly enclosed by ancient walls, it contains several churches, convents, and other public buildings, and is crowned by the magnificent ruin of a Saracenic castle. The trade is chiefly in wine, oranges, lemons, sumach, and olives. A British Vice-Consul is resident here.

Rising above it again is the small town of Mola, on a steep and picturesque elevation, 1,735 feet above the sea, with ruined walls and castle, and around are numerous remains of its once important position; chief above all is that of the theatre, east of the town, on a rise 800 feet above the sea; it is probably of Greek origin, and is the object of universal admiration, being wonderfully well preserved, and capable of accommodating about 40,000 spectators.

Communication. — There is a station at Giardini on the line between Catania and Messina, and a regular service of coaches to Taormina.

Supplies of fresh provisions and water in limited quantities may be obtained.

Landing.—With an easterly wind, landing is dangerous at Giardini.

Chart 188, Catania to Cefalu.

Capo Sant' Alessio (*Lat. 37° 55′ N., Long. 15° 22′ E.*), about 5 miles to the north-eastward of Capo Taormina, is an abrupt, bold cliff, bordered with rocks, with a tower and redoubt on it, and above it the old tower and castle of Forza d'Agro. The coast to the north-east of the cape is a steep bold beach, through which numerous mountain torrents run into the sea; and along which and on the rising ground above, are several towns and villages prettily interspersed, of which the principal are Savoca, famed for its wine, Pagliara, Roccalumera, and Nizza, the last being romantically situated under an ancient castle, near the mouth of a stream.

Rock. — A rock, with a depth of 6 feet over it, lies about 2 cables southward of Capo Sant' Alessio.

Punta Grosso (Capo d'Ali), nearly 8 miles north-eastward of Capo Sant' Alessio, is a bluff headland, with rocks at its base (*see* view facing page.) The town of Ali, of great antiquity, is just within the cape, and for ages was in great estimation on account of its mineral waters. It stands on a declivity of Monte Scuderi, 4,111 feet above the sea, and is remarkable for the constant wind blowing with some violence out of a cavern near its tabled summit. About 3 miles westward of the point, on a high peak, is Castello di Belvedere.

General charts 1976, 165, 1800, 1440, 2158a, b, 449.

Chart 188, Catania to Cefalu. Var. 7° 20′ W.

A line from Punta Grosso to Capo dell' Armi on the coast of Calabria, opposite, may be considered as the southern entrance to the Faro or Strait of Messina. The serrated hill of Pentadattillo (ancient Pentedactylus), 1,515 feet above the sea, which derives its name from its five crags and insulated base, and bears a great resemblance to the human hand, will be seen rising over the latter cape; about half way up the hill is a castle.

Capo Scaletta (*Lat. 38° 3′ N., Long. 15° 29′ E.*).—About 2½ miles beyond Punta Grosso the beach is broken by Capo Scaletta, a rocky point with an old tower on it, and just above it are the upper and lower towns of the same name. Between Capo Scaletta and Messina, a distance of 10 miles, in a north-north-easterly direction, the coast, which slightly curves, is a steep sandy beach, with from 10 to 50 fathoms water a cable from it. Along the coast and upon the slopes within, are scattered towns and villages, convents, &c., the chief of the former are San Paolo, Galati, and Gazzi, and of the latter Briga, Lardaria, and Bordanaro.

The mountain range, the foot of which recedes from the coast as Messina is approached, falls, at a distance of about 4 miles inland, from an elevation of between 3,000 and 4,000 feet above the sea; it is broken by numerous watercourses, which are generally wooded; there are also many vineyards and well-cultivated grounds.

Communication.—Scaletta has communication by railway with Syracuse and Messina, also telegraphic communication.

Anchorage.—Temporary anchorage for small vessels will be found close in off San Paolo, distant one mile from the cape.

Plan 1687, Messina harbour.

PORTO DI MESSINA is formed by a curved tongue of land, projecting first north-east from the mainland, and then bending round north and west in the form of a sickle, and named the Braccio di San Ranieri. Upon this ground are the British and French cemeteries, the coal depôt, and dock, with some saltworks; the Custom-house and pratique office are on the opposite side.

The entrance on the north, about 1¾ cables wide, is defended on the west, or land side, by a battery, and at the extremity of the curved projection, by Forte Campana and San Salvatore. The basin thus enclosed is about 1¾ miles in circuit, having from 10 to 36 fathoms water, over sand and mud; but on the eastern side of the harbour a bank, having 3½ to 4 fathoms water, extends 100 to 200 yards from the shore. In 1912, works were in progress on the eastern side between the Citadel and the coal depôt.

General charts 1976, 165, 1800, 1440, 2158a, b, 449.

No. 274.—Catania—Alteration in Character of Light on Light-Buoy.

Position.—Marking the outer end of the works in progress for the construction of the mole on the western side of the entrance to the port.

Lat. 37° 29¼′ N., long. 15° 06½′ E.

Alteration.—The character of the light of this light-buoy has been altered from fixed red to *flashing red every five seconds*, thus:—

Flash,	eclipse.
½ sec.	4½ secs.

Remarks.—The note on the chart with reference to this light-buoy is to be amended accordingly.

Chart No. 190. Med. 1, p. 575.

No. 348.—Messina Harbour, Punta Secca Light—Alteration in Character.

Position.—Lat. 38° 11¾′ N., long. 15° 34½′ E.

Alteration.—The character of the light has been altered from occulting red to *flashing red every two seconds*, thus:—

Flash,	eclipse.
½ sec.	1½ secs.

Chart No. 1687. Med. 1, p. 585.

No. 274.—Catania—Alteration in Character of Light on Light-Buoy.

Position.—Marking the outer end of the works in progress for the construction of the mole on the western side of the entrance to the port.

Lat. 37° 29½′ N., long. 15° 06½′ E.

Alteration.—The character of the light of this light-buoy has been altered from fixed red to flashing red every five seconds, thus:—

Flash,	eclipse.
½ sec.	4½ secs.

Remarks.—The note on the chart with reference to this light-buoy is to be amended accordingly.

Chart No. 190. Med. I, p. 575.

No. 348.—Messina Harbour, Punta Secca Light—Alteration in Character.

Position.—Lat. 38° 11½′ N., long. 15° 34½′ E.

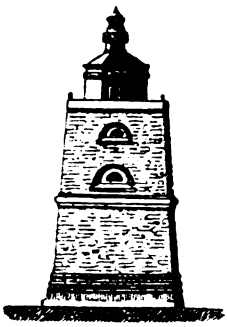
Alteration.—The character of the light has been altered from occulting red to flashing red every two seconds, thus:—

Flash,	eclipse.
½ sec.	1½ secs.

Chart No. 1687. Med. I, p. 58

Plan 1687, Messina harbour. Var. 7° 20′ W.

LIGHTS (*Lat. 38°12′N., Long. 15°33′E.*).—On Punta San Ranieri, the east extremity of the tongue of land forming Porto di Messina, is a white octagonal turret on a grey square tower, the whole 129 feet in height, and exhibiting, at an elevation of 133 feet above the sea, a *flashing white* light *every five seconds*, thus:—flash, *seven-tenths of a second;* eclipse, *four and three-tenths of a second;* it is visible in clear weather from a distance of 20 miles.



Punta San Ranieri lighthouse.

On Punta Secca, the north-east elbow of the land forming the harbour, from iron supports above a dwelling, the whole 19 feet in height, is exhibited, at an elevation of 26 feet above the sea, a *flashing white* light *every five seconds*, thus:—flash, *two seconds;* eclipse, *three seconds;* it is visible in clear weather from a distance of 10 miles. For arc of visibility, *see* Light list. Reported difficult to distinguish from the lights in the city.

An *occulting red* light *every ten seconds*, thus, light *five seconds*, eclipse *five seconds*, is shown, at an elevation of 74 feet above the level of the sea, from iron supports above a small white house situated on Forte Campana, at the extremity of the eastern entrance; the light is visible in clear weather from a distance of 8 miles.

From a pole near the health office, on the western side of the entrance of the harbour, two *fixed green* lights are exhibited at elevations of 29 feet and 39 feet, respectively. For arc of visibility, *see* Light list.

When the ferry boats are approaching a *green* light is shown from the western mole of the landing place and a *red* light from the eastern mole; *two red* lights, placed *vertically*, are also shown at the same time near the green light.

Buoys.—A cylindrical buoy is moored near the entrance to the dry dock. A mooring buoy for the use of Government vessels lies to the northward of the dry dock, and three mooring buoys for torpedo craft are situated in front of the liquid fuel piers.

Several bollards on the beach, in the northern part of the harbour, are not trustworthy.

Pilots.—As the currents are often very strong and variable, it would be imprudent to take a sailing vessel into port without a pilot.

Large vessels should obtain the assistance of the Harbour master in taking up berths.

Vessels engaging pilots from outside a line drawn between Punta

General charts 177, 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 1687, Messina harbour. Var. 7° 20′ W.

Secca lighthouse and the mouth of Torrente di San Francesco di Paola will pay at the following rates:—

Tons net registered	1 to 100	.....	20	lire.
„ „	101 „ 200	.....	30	„
„ „	201 „ 300	.....	35	„
„ „	301 „ 400	.....	40	„
„ „	401 „ 500	.....	45	„

Exceeding 500 tons, 3 centisimi for each ton over the fixed fee, the total not to exceed the sum of 130 lire.

Vessels engaging pilots from outside a line drawn between Mortelle and Bagnara (Calabrian coast) to the northward, and a line between Scaletta and Capo Pellaro (Calabrian coast) to the southward, will pay at the following rates:—

Tons net registered	1 to 100	.....	25	lire.
„ „	101 „ 200	.....	35	„
„ „	201 „ 300	.....	45	„
„ „	301 „ 400	.....	60	„
„ „	401 „ 500	.....	75	„

Exceeding 500 tons, 5 centisimi for each ton over the fixed fee, the total not to exceed 150 lire.

Note.—A vessel re-engaging a pilot on leaving, after having had him on arrival, pays only half of the above rates for the second pilotage.

Plan 1687, and chart 177.

Anchorages (*Lat. 38° 12′ N., Long. 15° 34′ E.*).—The best berths within the harbour for large vessels, of which there are three good ones, are between Via Vittorio Emanuele and a line joining Forte Campana with the railway station, the anchors being laid out north and south; room must be left for merchant vessels to moor with their sterns to the western shore, and also for those moored to the buoys upon the east side of the harbour.

The harbour, however, is so encumbered with moorings that considerable difficulty is experienced by vessels anchoring in laying the anchors clear of the numerous chains. Small vessels of war find convenient positions at the head of the port, their anchors out to the northward, and their sterns fast secured to the bollards on shore.

Vessels not wishing to enter the harbour may find temporary anchorage a little northward of the convent of San Francesco di Paola; the holding ground is good, but it should be observed that, like the harbour of Messina, this anchorage is much subject to eddies, and it is difficult, if not impossible, to keep the anchor clear if the vessel should remain more than a few hours. The shallows must be

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 1687, and chart 177. Var. 7° 20′ W.

avoided which lie off the river's mouth a little to the south. The anchorage directly off San Francesco di Paola is encumbered with anchors and chains, and should be avoided.

Convenient anchorage may be taken up, near the convent of Salvatore dei Greci, in depths of 10 and 20 fathoms, over sand. The convent, now used as barracks, is a large square building with a few and small windows in the south part of the building, and may be identified by a lime-kiln with a black-topped chimney immediately to the northward of it. The anchorage is off a conspicuous villa striped red and white.

In the months of December, January, and February, it is better to moor with both bowers, with an open hawse to the northward, as heavy gusts of wind blow down from that quarter, and without a sufficient scope of cable, the whirl and strength of the current, and the squalls combined, are likely to drive the vessel off the bank. With north-east winds, the anchors, with a good scope of cable, are not likely to drag, as the direction would be uphill.

Prohibited anchorage (*Lat. 38° 12′ N., Long. 15° 34′ E.*).—Anchoring immediately to the southward of Forte San Salvatore is prohibited.

Directions.—Vessels bound for this port should, for entering the strait, follow the general instructions given on pages 594, 595, and also take advantage of the current (*see* page 590). When the wind and current are adverse, it is necessary for sailing vessels to anchor until the current becomes favourable. When the wind is very strong it is advisable for a vessel not to attempt to enter the harbour, but to anchor either opposite Paradiso or Salvatore dei Greci. With a strong E.S.E. wind sailing vessels cannot enter the port, and may anchor off the entrance, dropping two anchors, and taking a hawser on shore as a precaution, in case of a change of wind.

In entering Messina harbour give Punta San Ranieri and Punta Secca a berth of at least half a mile, on account of the strong tide races which during spring tides extend from them. H.M.S. *Invincible*, entering under steam during spring tides, was twice turned by the tide eight points against the helm, the speed of the ship being seven knots.

Leaving the harbour with a north-east wind, sailing vessels should warp up under the walls of San Salvatore, and remain there until the tide sets out. With a north-west wind the vessel must be hauled over under the health office, and thence make sail off-shore.

CAUTION.—There is no regular tidal stream at Messina, but a rush of water occasionally enters and sweeps round the harbour, causing a variable current at the buoys, often running in opposite direc-

General charts 177, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 1687, Messina harbour. Var. 7° 20′ W.

tions within an interval of five minutes; caution is therefore necessary when making fast to a buoy, especially if vessels are secured to those adjacent to it.

City (*Lat. 38° 12′ N., Long. 15° 34′ E.*). — The city of Messina, formerly Messana, of which but few vestiges remain, stood on the site of Zancle or Sickle, from the shape of the harbour, a city founded in the year 732 B.C. In the year 1783 the city was almost destroyed by an earthquake, but was rebuilt, and became a flourishing and beautiful city until 1908, when, on December 28th, one of the most disastrous earthquakes ever recorded destroyed it totally. In 1911 the clearance of the old city, and the rebuilding of a new one on its site was commenced, and it is hoped very shortly that Messina will regain her former commercial prosperity. The population of Messina, including the outlying villages, was, in 1911, 126,172. A British Vice-Consul is resident.

Communication. — Almost daily communication by steamer with Naples (18 hours); twice every week with the Lipari islands; weekly to Palermo, Naples, Leghorn, Genoa, Catania, Syracuse, Malta and Tripoli; fortnightly to Stromboli, Tunis, Algiers, Oran, Malaga, Gibraltar, and Tangier; besides which several lines of steamers to the Adriatic, Constantinople, the Black sea ports, and Alexandria, call at the port. The Cunard line emigrant steamers to the United States call here regularly.

Ferry boats, which leave from a pier south-west of the citadel, make two trips a day to Reggio in connection with the train service.

Railway communication with Palermo and Syracuse, a steam tramway to Barcellona, northward, and Giampilieri, southward, which is shortly to be electrified. Telegraphic communication with all parts: the telegraph office is always open.

Coal and supplies. — About 9,000 tons of coal are kept in stock; there are 30 lighters, holding from 20 to 25 tons, also a coal wharf 400 feet in length, with depths of from 19 to 24 feet alongside, but it was damaged by the earthquake. Coaling is now (1912) carried out by means of a 7,000-ton coal hulk, fitted with electric light, transporters, travelling cranes, and all modern appliances.

Supplies of fresh meat, vegetables, and bread, can be procured, and water from a public fountain, pure, but somewhat hard. Tank vessels are always available, and water is also supplied by the coal hulk. Water may also be obtained by digging holes in the sand on either side of the strait.

Dock.—There is a dry dock on the eastern side of the harbour. For particulars, *see* Appendix I.

General charts 177, 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 1687, Messina harbour. Var. 7° 20′ W.

Harbour regulations.—The speed of any vessel, when entering or leaving the port, is not to exceed 5 knots.

Time signal.—Near the north-east end of Forte San Salvatore a time-ball is dropped and a gun fired, simultaneously by electricity, at noon Central European time, corresponding to 23h. 00m. 00s. Greenwich mean time.

Trade.—The principal exports are wine, silk, lemons, oranges, pumice stone, walnuts, and filberts; and imports, coal, timber, petroleum, wheat, and stock-fish. In 1911, 111,448 tons of coal were imported.

Shipping.—In 1911, 863 steam vessels, with a total tonnage of 1,265,295 tons, entered the port, and 36 sailing vessels, with a total tonnage of 4,969 tons.

Chart 177, The Faro, or Strait of Messina.

STRAIT OF MESSINA (*Lat. 38° 16′ N., Long. 15° 39′ E.*).—El Faro, or Strait of Messina (the Fretum Siculum of the ancients), is bounded on the south by Punta Grosso and Capo dell' Armi, on the Calabrian coast, where it is 12 miles wide; from thence it trends in a northerly direction for a distance of about 14 miles, gradually narrowing to a width of 2¾ miles off Messina, from thence it curves to the north-eastward, and has a width of 1¾ miles between the overlapping points of Sicily and Calabria, finally entering Golfo di Gioia, northward of Capo Peloro.

This strait, dreaded by the ancients, and invested by them with many imaginary terrors, requires some caution in its navigation, on account of the rapidity and irregularity of the currents, known to them as the Charybdis, but now locally termed Garofali. The winds are also baffling when off the high land, and heavy gusts blow down the valleys and gorges; without a steady and commanding breeze a sailing vessel may become quite unmanageable, and a vessel under steam be turned round. The strait is everywhere clear of danger, and the water deep.

Local winds.—In winter the strongest and most frequent winds are those from E.S.E. and W.S.W., the latter being accompanied by a heavy sea. In this season the conflict between opposing winds is frequent, especially when that from the north-west, which blows down the Tyrrhenian sea, is fresh.

West winds are not so lasting as those from south-east and south-west; they may blow very fresh, but soon moderate. The south-east wind, on the contrary, becomes stronger and stronger, and blows sometimes for fifteen successive days. The wind from south-west generally

Chart 177, The Faro, or Strait of Messina. Var. 7° 20′ W.

follows, but lasts only a short time, gradually veering to the north, when fine weather is re-established.

In summer, the fine weather is accompanied by winds from the north-west and north; when from the latter quarter it is nearly always calm in the Strait of Messina; whilst at Messina itself and Reggio the breeze is sometimes very fresh; it generally, however, falls in the evening, and does not raise much sea. During the fine season, the strait is the line of separation of winds from east and south-west. The clouds brought by the latter accumulate over the strait, where it is a dead calm, while a fresh breeze blows outside.

At times a northerly wind blowing through the strait meets a southerly some 20 miles below it, or a wind from the Adriatic, off Capo Spartivento, causing much aerial commotion. On the coast of Sicily, between Taormina and Riposto, this is locally named Del Golfo di Cantara.

Precautions should be taken against the heavy gusts, dangerous to small vessels, which at times rush down the valleys.

A Meteorological table for Messina is given in Appendix III.

Currents and tidal streams (*Lat. 38°16′N., Long. 15°39′E.*). —The currents in the Strait of Messina are variable, and at times attain a velocity of 5 knots an hour. They are, however, to a great extent tidal, their greatest strength being on the day following the full and change of the moon. Occasionally the tidal streams are overpowered by other general movements of the water in the neighbourhood, from winds or other causes, and the stream may then run in one direction for many hours.

The stream runs to the northward with a rising tide and to the southward with a falling tide, but near the coast there are counter-currents of which the mariner may take advantage. These counter streams, which are felt between one and two hours after the commencement of the main stream, are termed Refoli when produced by the falling tide, and Bastardi when caused by the rising tide.

On the Sicilian side the principal counter streams of the ebb occur between Torre Palazzo and Capo Peloro; Pace and Fiume Guardia; Salvatore dei Greci and S. Francesco di Paola. The breadth of these counter-currents increases in proportion as the general stream has more duration, and is important during springs, when they extend a mile from the shore.

On the Calabrian side the counter stream on the ebb does not occur north of Punta Pezzo, but thence south to Catona (opposite Messina) is about a mile in breadth. With the northerly stream, the only important counter-current or Bastardi on the Sicilian side occurs in Messina strait, between the lighthouse and Punta Palazzo; the others are insignificant.

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Chart 177, The Faro, or Strait of Messina. Var. 7° 20′ W.

On the Calabrian side, however, 2 hours after high water, between Alta fiumara and Punta Pezzo, there is an eddy setting to the south, having its greatest breadth off Cannitello, where it extends about half a mile from the shore.

At full and change the southerly stream begins at 9h. a.m. at Capo Peloro, Messina strait, and sets towards Alta fiumara in Calabria, thence to Punta Pezzo, and towards Pace in Sicily; afterwards to Salvatore dei Greci, arriving off the north-east lighthouse of Messina about 11h., setting thence towards Reggio in Calabria.

At full and change the northerly stream commences about 3h. at Punta Pezzo, gradually enlarges, and uniting with the counter-current between Torre Palazzo and Punta Sottile, the whole stream runs to the north-east, in the direction of the channel. After two hours direction changes towards Scilla, but at the same time a stream from the north unites with the former, near Scilla, and causes a current towards the offing. At Messina the northerly current does not commence till about 5h.

At neaps the southerly streams follow the same direction as those of full and change, and produce the same counter-current, but with less velocity. It begins at Capo Peloro at 0h. 45m., and off Messina at 3h. 45m. At Capo Peloro the rise of water is scarcely perceptible; at Messina the maximum rise is frome 10 to 13 inches, but it is greatly influenced by the winds.

The meeting of the two opposing currents produces in several parts of the strait, whirls and great ripplings, locally termed Garofali; they are represented on the chart by a scroll. The principal are, on the coast of Sicily, between Capo Peloro and Punta Sottile, with the ebb, and off Torre Palazzo with the flood; the latter are very strong. Off Punta Secca, the north-east extreme of the Braccio di San Ranieri, it is also very strong, and dangerous with a south-east wind.

At Punta Pezzo, on the Calabrian coast, there is a very strong Garofali, which is also dangerous with a south-east wind. The other great ripplings without whirls, caused by the current over the uneven bottom, are termed Scala di Mare.

To the southward of Capo Peloro, in Calabria, the tidal streams are not felt, and the current generally is determined by the wind.

The celebrated vortex of Charybdis, so much dreaded by the ancients, is described by Admiral Smyth as that outside the Braccio di San Ranieri, but in the French survey of the strait in 1858 the position of Charybdis is assigned to the Garofali, immediately southward of the Faro, and this being so much nearer Scilla would be more in accordance with the famous proverbial expression, "Incidit in

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Chart 177, The Faro, or Strait of Messina. Var. 7° 20′ W.

Scyllam cupiens vitare Charybdim," applicable to those who, to avoid a less, run into a greater, danger.

Pilots. — As before remarked, the navigation of this strait is at times difficult, on account of the various movements of the current, it would therefore be imprudent for a stranger to take the passage in a sailing vessel at night without a pilot. If from the north, pilots are found some miles to the northward of Capo Peloro light; if from the southward, 3 or 4 miles south of Messina.

The rates of pilotage are as follows:—

1 to 100 tons	.....	25 lire.
101 „ 200 „	.....	35 „
201 „ 300 „	.....	45 „
301 „ 400 „	.....	60 „
401 „ 500 „	.....	75 „

501 and over, 5 centisimi for every ton above the fixed fee, not exceeding the sum of 150 lire.

Gun practice occasionally takes place from the forts on each side of the strait; when a fort is firing a red flag is hoisted, and vessels are warned thereby to keep at a distance of 3 miles from the fort.

Anchorages. — Between Paradiso and Capo Peloro are the following anchorages:—

Pace (Grotta).—In from 11 to 16 fathoms water, over sand, about 1½ cables from the shore, and north-east of the remarkable cupola of Santuario della Grotta.

Communication.—A steam tramway runs to Messina and Barcellona, and there is telegraphic communication during limited hours.

Supplies of fresh provisions and water may be procured in limited quantities.

Canzirri (Ganzirri) (*Lat. 38° 15′ N., Long. 15° 37′ E.*). — The anchorage is in front of the village, in about 6 fathoms water, over sand, with good holding ground, but in winter it is exposed to winds from south-eastward which cause a heavy sea.

Communication. — Steam tramways to Messina and Barcellona.

Supplies. — Moderate supplies of fresh provisions may be procured.

Piana di Faro.—Anchorage may be obtained off the village in 16 fathoms water, about three-quarters of a cable from the shore.

Communication. — A regular service of steam tramways to Messina and Barcellona, and good roads.

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Chart 177, The Faro, or Strait of Messina. Var. 7° 20′ W.

Supplies of fresh provisions and water, in limited quantities, may be procured.

Calabria.—The anchorages upon the Calabrian side of the strait are scarcely available for strangers except in cases of emergency, as the water is deep and the shore steep. The best places are in the bay of Marina di Scilla, where there is a lifeboat; off Reggio, and in the bay 1½ miles north of it; and to the southward, about the same distance north of Punta Pellaro. Except off Scilla there are depths of from 16 to 20 fathoms, at half a cable from the shore.

Between Messina and Capo Peloro the shore is everywhere bold, and there are no dangers more than 1½ cables distant.

Telegraph cables.—Four telegraphic cables are laid across the Strait of Messina; anchorage in the vicinity of the cables is prohibited.

Capo Peloro or di Faro, the north-east extreme of Sicily, was the Pelorum Prom. or Cape Pelorus of the ancients. It is a low sandy point, which is being gradually washed away, and near its extremity is an old fort on which is a lighthouse; there are also two other lighthouses, one westward and one southward of the old fort. The village of Faro stands on the coast a quarter of a mile south-west of the old fort. Between the beach and the hills, on the east and south, are two lakes, named Pantano Grande and Pantano Piccolo, united by a canal, the village of Canzirri and two towers are between Pantano Grande and the coast. *See* view, page 604.

LIGHTS (*Lat. 38° 16′ N., Long. 15° 39′ E.*).—From a turret on the tower of the old fort on the eastern extreme of Capo Peloro, at an elevation of 85 feet above the sea, is exhibited an *occulting white* light *every five seconds*, thus:—light, *three and a half seconds;* eclipse, *one and a half seconds.* It is visible in clear weather from a distance of 12 miles.

At Punta Sottile, 1¾ cables southward from the preceding lighthouse, a grey cylindrical iron shed, exhibits an *occulting green* light *every five seconds*, thus:—light, *three and a half seconds;* eclipse, *one and a half seconds.* It is elevated 26 feet above the sea, and is visible in clear weather from a distance of 4 miles.

A *fixed green* light, which, in clear weather, is visible from a distance of 2 miles, is exhibited from a white circular tower, 39 feet in height, on Punta Mazzone, about half a mile westward of Capo Peloro, to mark the position of the telegraph cable laid between Calabria and Capo Peloro. For arc of visibility, *see* Light list and plan.

Signal station.—Semaphore.—Storm signals.—Upon Forte Spuria, on the hill, nearly 1¼ miles westward of the lighthouse of Capo Peloro, is a semaphore, 321 feet above the sea, with which vessels may communicate. Storm signals are also shown here.

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 177, The Faro, or Strait of Messina. Var. 7° 30′ W.

Anchorage (*Lat. 38° 16′ N., Long. 15° 40′ E.*).—A bank, with depths of from one fathom to 5 fathoms over it, extends nearly 3 cables eastward of Capo Peloro; at half a mile distant from the cape there are 20 to 30 fathoms, when the water rapidly deepens to 150 fathoms in mid-channel. Temporary anchorage will be found on the bank, in from 10 to 20 fathoms water, over sandy bottom, with Spuria semaphore brought either just north or south of the lighthouse; it is, however, exposed, should be used only in summer, under favourable circumstances, and care must be taken to avoid the wrecks that lie there.

Prohibited anchorage.—Anchorage or fishing is prohibited within the area covered by the sector of visibility of the light on Punta Mazzone, in order to avoid fouling the telegraph cable.

Directions. — A vessel entering the Strait of Messina from the north-west should, to clear Modeste shoal (Secca Rasocolmo) (*see* page 610) keep Capo Peloro lighthouse bearing southward of 129° true, and may round the lighthouse at a distance of 4 cables and in not less than 20 or 30 fathoms water; carefully checking the distance by bearings of Scilla and Punta Pezzo, or by angles of elevation of the lighthouse.

From the northward, a sailing vessel bound through the strait, with a good breeze and southerly current, should take the middle of the channel, and when abreast Capo Peloro, steer for Messina; but on arriving on the line between Punta Pezzo and Pace, alter course for Punta Pellaro, and approach the coast of Calabria, where the tidal stream is more favourable; when off Reggio keep in the middle of the channel, and the strait will be cleared without difficulty.*

With a northerly wind and a northerly current, get into the counter stream of Alta fiumara, north of Cannitello village, with the assistance of which Punta Pezzo will be reached without difficulty; thence steer towards Pace, and then for Punta Secca lighthouse of Messina; when opposite the convent of San Salvatore dei Greci keep for Reggio, where the current will be weaker.

With the wind and current both south, after reaching the counter stream on the ebb, tack towards the coast of Sicily, and tack again before entering the eddy off Pace; another tack will take the vessel off Cantona, but do not approach the land on account of the counter-current; then stand towards Messina, and at a reasonable distance

* Directions by M. Darondeau, Hydrographic Engineer, Imperial French Navy.

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 177, The Faro, or Strait of Messina. Var. 7° 20′ W.

from it tack; on this tack towards Pentimele the land may be approached as there is no northerly eddy.

Continue to work to windward by making tacks towards Sicily a little beyond the middle of the channel, and those towards Calabria nearer the land; after passing Capo Scaletta, the next tack will take the vessel to Punta Pellaro, but should she fall to leeward of it, the land should not be approached, on account of the counter-current, but the cape once passed, the tacks may be continued closer in to the land.

Bound southward, when the wind and tide are both contrary, it is best to reduce sail, and keep off the north coast of Sicily between Capo Rasocolmo and Mondello fishing village, so as to be at the entrance of the strait at the moment of the turn of the tide; or anchorage may be taken up on the Faro bank, to await the change.

From the southward.—If from the south, with a fair wind and current, a vessel should keep nearly in mid-channel, borrowing towards the Sicilian coast; when abreast of Messina, steer for Capo Peloro, and when off Punta Pezzo keep a little more to the east towards Palmi to avoid the counter flood south of the two coasts, then keep more to the northward, and when clear of the shoal water off Capo Peloro, steer for Stromboli.

When off Punta Pellaro, with the wind south, and the current running to the southward, keep along the coast of Sicily at the distance of a little more than a cable, to profit by the eddy which runs to the north; when nearly up to Messina, stand over for the coast of Calabria, get into the counter stream of Acciarello, and keep along shore as far as Punta Pezzo; if the southerly stream is still strong, it will be necessary to approach again the coast of Sicily towards Canzirri, where the tide will be found favourable; but should it be weak, a course can be made direct for Capo Peloro, and thence out of the strait.

With the wind and current north, work to windward on the coast of Calabria as far as Torre Lupo below Reggio; from there make a tack for the opposite coast, and continue upon that side, making the off-shore tack to about the middle of the channel, and the other near the coast; when abreast of Messina, stand farther over to Calabria, and work up as upon the opposite side for Punta Pezzo; when abreast of it, work in mid-channel, to avoid the eddies; if, however, Canzirri can be reached on one tack, keep in, to Torre Palazzo, standing off to the middle of the channel, and keeping a little off the tower when standing in.

Once to the northward of the shoal off Capo Peloro, a vessel can get to windward by making a short tack towards the Sicilian coast,

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 177, The Faro, or Strait of Messina. Var. 7° 20′ W.

and a long one towards Calabria if the weather be fine, thus allowing the land breeze, which gets up in the evening, to be taken advantage of. But should the weather be bad, the long tacks should be made towards the coast of Sicily, always remembering to keep clear of Modeste bank.

When near Punta Pellaro, with a northerly wind, the ebb or southerly current, work in the bay north of it, to take advantage of the counter-current; from Torre Lupo, keep over on the coast of Sicily, and there work to windward, tacking when in mid-channel; when off the Fiumara di Don Brasco, near the south of Messina, cross to the coast of Calabria for the Acciarello eddy, working to windward to Punta Pezzo; from there stretch over as far as the Sicilian coast, but should the current be too strong and the breeze too weak to reach it, heave-to in the favourable eddy, and await the turn of tide; when Pace can be reached, work in the counter-current as far as Capo Peloro, and continue the route as before directed.

Approaching the strait at night, if from the southward, the light on Capo dell' Armi is visible about 16 miles, and that on Punta Pezzo a distance of 13 miles; if from the northward, the light on Capo Peloro at about 14 miles, San Ranieri, 20 miles, and that at Scilla 16 miles.

CAUTION.—Strangers passing Milazzo lighthouse, and bound to Messina, in thick or blowing weather, may be mistaken with respect to the entrance of the strait, as there is more the appearance of a strait southward of Vaticano than at the actual opening, and the error has proved fatal to many vessels. *See* view on chart 188.

Chart 172, Lipari islands.

LIPARI OR ÆOLIAN ISLANDS.—The group consists of seven principal islands, viz., Stromboli, Panaria, Salina, Lipari, Vulcano, Filicudi, and Alicudi, with several islets and rocks. They are all irregular in outline, and comprise with Ustica a coastline of 77 miles; they are mountainous and all of evident volcanic origin, with distinct craters on several, two of which are active.

Plan 168, Ustica island.

USTICA (*Lat. 38° 43′ N., Long. 13° 12′ E.*) (the ancient Osteodes) is situated 55 miles to the west-north-west of Alicudi, and 36 miles north-eastward of Capo San Vito, in Sicily, and lying, as it does, somewhat in the track of vessels from the westward, it forms an excellent mark for those bound to Palermo, and the north coast of Sicily.

Ustica is high in the middle, but at a distance of 20 miles eastward or westward, it appears as two small islands.

General charts 170, 165, 676, 1440, 2158a, b, 449.

Plan 168, Ustica island. Var. 8° 10′ W.

It is 2½ miles in length, in an east-north-east and west-south-west direction, and about 1½ miles in breadth, and is entirely composed of volcanic substances, but is extremely fertile, and well cultivated, and has a population of about 1,900. On several parts of the coast there are spacious grottoes, with deep water in them, of which one on the eastern side has a singular stalagmitic incrustation of shells intermixed with lava. Another near it, with a very low entrance, is so roomy within that in former times fishermen have sought security in it from the Barbary cruisers. Torre del Spalmatore, a square tower, commands a landing place at the south-west end of the island.

In the vicinity of the coasts, the water is generally deep, a depth of 30 fathoms being found at half a cable distant; and in some parts nearer.

Off the west side of the island, 1½ miles distant, is Secca d'Apollo, having depths of 17 to 26 fathoms, over coral.

LIGHTS (*Lat. 38° 43′ N., Long. 13° 12′ E.*).—On Punta Uomo-Morto, on the north side of Capo Falconara, a white turret, 23 feet in height, and with a dwelling adjoining, exhibits, at an elevation of 328 feet above the sea, a *fixed* and *flashing white* light *every thirty seconds*, thus:—flash, *eleven seconds;* fixed, *nineteen seconds.* It is visible in clear weather from a distance of 22 miles. For arc of visibility, *see* Light list and plan.

On Punta Gavazzi, the south-west extreme of the island, a white tower, 92 feet in height, and with a dwelling adjoining, exhibits, at an elevation of 131 feet above the sea, a *fixed* and *flashing white* light *every minute*, thus:—fixed, *thirty-five seconds;* partial eclipse, *ten and a quarter seconds;* flash, *four and a half seconds;* partial eclipse, *ten and a quarter seconds.* It is visible in clear weather from a distance of 10 miles. For arc of visibility, *see* Light list and plan.

Signal station.—Semaphore.—On Monte Guardia dei Turchi is a semaphore, with which vessels can communicate.

Storm signals.—Storm signals are also made at the signal station.

Dangers.—Scoglio il Medico, nearly 3 cables north-westward of Punta di Megna on the north-west side of the island, and nearly abreast the steep cliffy cove of Madonna della Croce, is a large and singular islet or rock of lava, having ledges extending from its south-west and north-east sides.

Secca di Colombara (Walker rock), 5½ cables northward of Testa del Russo (Punta Gorgo Salato), the north point of Ustica, is a

Plan 168, Ustica island. Var. 8° 10′ W.

bed of sunken rocks, about a cable in extent, with 6 feet water on them and 14 fathoms close around. Torre del Spalmatore, seen over Punta di Megna, bearing 201° true, leads westward of Secca di Colombara. *See* view on plan.

Submarine telegraph cable.—A submarine telegraph cable is laid from Naples to Ustica, and thence to Palermo. The cable-house (with the inscription, "Cavo sottomarino") is situated about 22 yards from the sea in Cala di Santa Maria. Two white frame balls indicate the direction of the inshore portion of this cable, also for the distance of about one cable of that of the telegraph cable to Palermo, which then trends in a southerly direction.

On the seaward side of the cable-house, a notice prohibiting anchorage, &c., is affixed.

Anchorage (*Lat. 38° 42′ N., Long. 13° 12′ E.*).—The anchorage is in from 4 to 4½ fathoms water, over sand and weeds, about half a cable from the shore and westward of the line of telegraph cable; the telegraph cable is clear of the usual anchorage, but vessels must not anchor with the two white balls, marking the direction of the cable, in line.

There is good anchorage, with south-westerly winds, between Capo Falconara and Punta Gorgo Salato, in 12 to 14 fathoms, with Capo Falconara just shut in behind Punta Uomo Morto and the semaphore bearing 235° true.

Town.—The only town is Santa Maria, above the sandy beach at the head of a little cove, on the east side of the island; it is clean, with regular streets, a church, hospital, schools, &c. The cove is about a cable wide and the same deep, with 5 fathoms water in the middle, and is sufficiently large for the small trading vessels which resort to it; it is safe with all winds but the scirocco. On the north side of the cove is Collina di Falconara, with an old fort on its summit; and on the hill on the south side is a conspicuous square tower and a windmill.

Ustica has a numerous colony of convicts and a company of soldiers to look after them.

Communication.—There is a steamer twice every week to Palermo, and telegraphic communication at limited hours.

Supplies.—A small quantity of fresh provisions and water may be procured.

General charts 170, 165, 676, 1440, 2158a, b, 449.

Chart 172, Lipari islands. Var. 7° 50′ W.

Alicudi (ancient Ericusa), the western of the Lipari group, is about 4½ miles in circumference, and rises abruptly as a conical crater, 2,172 feet above the sea, with irregular ravines and precipitous hills; and although its fires have been extinct for many ages, lava is seen in wild grotesque streams from the summit to the sea, so harsh and durable as still to retain the sterile, forbidding appearance of a recent eruption.

Notwithstanding this discouraging aspect, Alicudi is well cultivated in every place capable of vegetation; and particularly between all the interstices of the shattered masses, where, by constant exertion, barilla, flax, capers, pulse, and excellent wheat are produced. The population is about 1,000. The church, which is on the south-east side, is so high, and the land beneath is so steep, that a view from it is like looking from the masthead of a vessel.

Communication. — There is a steamer every fortnight to Filicudi, Lipari, and Messina.

Supplies.—Fresh provisions and water are very scarce.

Landing. — The coasts of Alicudi consist of craggy precipices, among which are two small but insecure landing places, of which the one to the south-east under Punta Palumba is the better, and here the fishermen haul their boats up on a patch of sand; the other is in a small cove, on the north-east side; but both are difficult of access in fresh breezes; within half a mile of the coast the depth of water is more than 150 fathoms.

Filicudi (*Lat. 38° 35′ N., Long. 14° 34′ E.*) (ancient Phœnicusa), situated 8½ miles eastward of Alicudi, is an extinct volcano with three high summits, but except a spring of hot sulphureous water, there are no remains of fire, nor does history record any eruption of it. The island is 3 miles in length in a north-westerly and south-easterly direction, nearly 1¾ miles in breadth, with a coastline of 8 miles, and 2,598 feet above the sea.

Its coasts are rugged and broken, and exhibit grand masses of basaltiform lava. On the western coast, between two small projecting points, is a remarkable grotto, which may well be imagined to have given the idea of the caves of Æolus. A perforation upwards of 60 feet wide and 30 feet high, through which a boat can pass, forms the entrance to a natural colonnade, and widens gradually into an extensive hall with spacious arches. This magnificent cavern is about 160 feet long, 120 broad, and 50 in height, and forms a cool retreat in which seals have occasionally been seen.

The south-east end of the island is a small peninsula, 371 feet above the sea, and of a conical shape, connected to the main island by a

Chart 172, Lipari islands. Var. 7° 50′ W.

low and fertile isthmus, which forms a bay on each side. From the north-eastern end, a steep and intricate path leads to the church and principal houses. The population is about 800; they are said to be hardy, industrious, healthy, and peaceable. The houses are flat-roofed, built on the isthmus and on the side of the hills.

Anchorage.—Small vessels anchor close to the shore either north or south of the isthmus and secure to the rocks.

Dangers.—La Canna (*Lat. 38° 35′ N., Long. 14° 32′ E.*).—Lying 6 cables west-north-westward from Punta Notaro, on the north-west side of the island are two rocks, Monte Nassa and La Canna; the latter is a slender rock, 280 feet high, and has frequently been mistaken, at a little distance, for a sailing vessel before the wind; rocks and shoal water extend a quarter of a mile west and south-west, and there are several rocks about fringing the coast of the island, with deep water between them and La Canna.

A small shoal, with 3½ fathoms water over it, lies 6 cables east-north-eastward of Punta della Carestia, the north-west part of the island, and there is a depth of 9 fathoms about mid-way.

A shoal, with 6 feet water over it, lies about a cable off the north-east part of Capo Graziano, and with the above exceptions the island is steep-to, but skirted here and there, close in, with a few rocks.

Above a mile north-westward of La Canna is Secca di Filicudi, a bank of 21 fathoms, with 85 fathoms between, and from 100 to 200 fathoms half a mile off.

Communication.—The steamer running between Alicudi and Lipari calls every fortnight.

Water.—Rainwater is preserved in cisterns, there being no fresh water on the island.

Trade. — Filicudi is well cultivated, and produces wheat, barley, grapes, olives, pulse, and flax; cattle and fruit are exported, and there is a small coral and sponge fishery.

SALINA, 9½ miles eastward of Filicudi, is 4 miles long in a north-westerly and south-easterly direction, and nearly 3 miles at its broadest part, with a circumference of 11½ miles. Its ancient name was Didyme, or Twins, from the appearance of the two high conical summits that distinguish the island (*see* view on chart); it possesses several warm springs, and remains of the ancient baths still exist on its west side. The population is about 5,000.

The origin of the island seems to have been altogether volcanic, vestiges of its craters may still be seen, but the fires must have ceased before the dawn of history, and they have now become the most pleasing and fertile spots in the whole group of the islands. Between

Chart 172, Lipari islands. Var. 7° 40′ W.

Monte Porri (2,850 feet high), to the westward, and Monte San Salvatore (3,125 feet high), to the south-east, the valley extends each way to the sea, and is so rich and productive as to merit its name of Fossa felice or Happy valley; and here the various trees bear with such exuberant luxuriance that the natives say the earth is proud of its vigour.

LIGHT (*Lat. 38° 35′ N., Long. 14° 52′ E.*).—A *fixed white* light is exhibited, at an elevation of 174 feet above the sea, from a light yellow octagonal tower, 30 feet in height, and situated on Lo Capo, the north-east extreme of the island; it is visible in clear weather from a distance of 19 miles. For arc of visibility, *see* Light list and chart.

Coasts.—The south-east end of the island is a low shingle point named La Lingua; here are the salines, whence the island derives its present name. Shoal water extends nearly 2 cables from the point. About midway along the south-west side of the island is the village and church of Rinella, whence a road leads through the valley to La Malfa, and another to Santa Marina.

The north-west coast is abrupt and singular from its stupendous overhanging cliffs, and near its north-west point is a high, red, pyramidal rock, named Faraglione. The hills abound with various game, and form a pleasing amphitheatre, enclosing a fertile cultivated valley. The north-west extreme of the island is a remarkable perforated point between which and the north-east extreme is a populous district and well-wooded heights; the town and church of La Malfa is about midway between.

On the north coast there is excellent fishing, and the Pinna Marina, a gigantic kind of mussel, termed by the ancients the silkworm of the sea, is found in abundance about the island, with its curious attendant crab. The Paper nautilus is also found here, generally during the time that hawk's-bill turtle are taken.

Submarine telegraph cable. — A telegraph cable connects Salina with Lipari.

Anchorage.—There are several anchorages, where small vessels load with the produce of the island; northward of Punta Lingua in depths of from 19 to 22 fathoms about 1½ cables from the shore, or at three-quarters of a cable distant in 6 fathoms water also southward of the point in about 8 fathoms water at one cable distant, off Rinella, in 14 fathoms water, over sand, and in the same depth and over a similar bottom between Faraglione and Punta Perciato.

General charts 1976, 165, 1800, 676, 1440, 2158a, b, 449.

Chart 172, Lipari islands. Var. 7° 40′ W.

Towns.—Santa Marina, near the middle of the east coast, is the principal town of the island, and may be recognised by a church, with a large white cupola. The other towns are La Malfa on the north, Pollara on the west, and Rinella on the south coasts; each has a church, surrounded by low flat-roofed houses.

Communication. — There is a steamer daily to Milazzo and Lipari, and steamers frequently to the other islands of the group; telegraphic communication with all parts at limited hours.

Supplies. — Moderate supplies of fresh provisions may be obtained; water is procured from a private cistern; there is a spring of good water constantly running near Santa Marina church, and it may be found by digging anywhere on the beach.

Trade. — In consequence of this fertility, an excellent revenue is derived from the exportation of grain, fruit, pulse, capers, salt, alum, soda, and wines, of which last the fine Malvasia is unrivalled.

Secca di Capo (*Lat. 38° 37′ N., Long. 14° 55′ E.*). — A shoal with 4¼ fathoms over, and deep water around it, lies north-eastward, distant 3 miles from Lo Capo lighthouse. (*See* view on chart.) It was named by Captain Smyth (who discovered it), Penrose shoal, but it now appears on the chart as the Secca di Capo. It is covered with marine plants and abounds in fish, and is much frequented by fishermen.

Deep water surrounds Salina, and between it and Lipari there is a depth of more than 170 fathoms.

LIPARI, formerly named Lipara, the principal island of the Æolian group, and separated from Salina by a channel 2¼ miles wide, is 5¼ miles in length in a north and south direction, and 4 miles in breadth, having a coastline of 16½ miles. The chief features of the island are the two mountains, Sant' Angelo, 1,946 feet high, near the centre, and Monte della Guardia, 1,211 feet high, on the south. *See* view on chart.

The interior of the country is singularly rugged and broken, with sterile hills of volcanic glass, porphyritic lava, pumice, and other vitrifications, many of which must be more than 3,000 years old, and yet exhibit no symptoms of decomposition. Between the hills are deep valleys or ravines, apparently worn through by the action of heavy rains, and along these the roads lead (often only from 5 to 10 feet wide) between cliffs of a frightful height and aspect. The population of the island is about 15,400.

East coast.—The land forming Monte Rosa projects a mile eastward from the general line of coast, and on its north side, at the head of a bay, is the village of Canneto, prettily situated southward of the

Chart 172, Lipari islands. Var. 7° 30′ W.

white cliffs of an enormous mass of pumice, named Campo Bianco, which terminates in Punta della Castagna, the north extreme of the island.

Anchorage, locally known as Le Oncie, may be obtained off the village in 8 or 9 fathoms water, over weeds, about a cable from the shore, avoiding the telegraph cable; the prohibited anchorage is pointed out by a tablet situated about a cable southward of the church in the centre of the village.

North coast. — Between Punta della Castagna and Punta del Legno Nero, the north-west extreme of the island, is the village of Acqua Calda, and on a hill above the village is the town and church of Quattra Pani, and over it Monte Chirien, 1,975 feet above the sea.

Anchorage, sheltered from southerly winds, but otherwise exposed, may be obtained off Acqua Calda; a notice points out the prohibited anchorage on account of the telegraph cable.

West coast. — From Punta del Legno Nero, the coast to the southward is a steep cliff; at three-quarters of a mile beyond the point, and not far from the shore, is a high bold rock named Toricello (Scoglio Immeruta), and about $1\frac{3}{4}$ miles farther on are Pietra Piramida. A few steps and a winding path permit a landing at a tower just southward of Pietra Piramida; the tower is constructed of the finest lithologic specimens in the island, and stands at the end of a valley where there are some ancient caverns, and other natural curiosities.

Secca di Bagno (*Lat. 38° 28′ N., Long. 14° 53′ E.*). — Pietra del Bagno, situated $1\frac{1}{10}$ miles southward of Pietra Piramida, and about a quarter of a mile from the shore, is a steep mass of lava, and nearly half way between is another with a shoal to the westward of it. From Pietra del Bagno the coast of Lipari trends to the south-east, forming a bight and one or two little bays to Punta Capparo (della Crepazza), the south extreme of the island.

Secca di Bagno, a ledge, a cable in extent, with a depth of 8 fathoms over, and deep water around it, lies nearly one mile south-eastward of Pietra del Bagno; from it Pietra Lunga is just open north of Vulcanello bearing 122° true. The bank is a good place for fish.

A little to the west of the south end of the island are two remarkable rocks, of which the north-eastern, named Pietra Lunga, is a a heap of volcanic laminæ in a highly-vitrified state, 150 feet above the sea, with an aperture at its base through which boats may pass, appearing at a little distance like a vessel under sail. The other rock, Pietra Menalda, is much lower, and abounds in a kind of large gull, prized by the natives.

General charts 1976, 165, 1800, 676, 1440, 2158a, b, 449.

Chart 172, Lipari islands. Var. 7° 30′ W.

To the northward of these rocks, distant about a third of a mile, are other isolated rocks, named Scogli delle Formiche. There is anchorage in 12 to 15 fathoms, sand, in a bay about a mile north-westward of Scoglio Formiche on the line between Punta San Jacopo, the south-eastern point of the bay, and Punta delle Fontanelle (Grotticelle), the north-western point, which may be recognised by its caves and yellow and red rocks, with Scoglio Formiche in line with Pietra Lunga. A mile to the north-east of Punta Capparo is Punta San Francesco, of rugged lava, forming the south extreme of Rada di Lipari.

Plan of Lipari anchorage on 172.

Rada di Lipari, on the south-east side of the island, is bounded on the north by the promontory of Monte Rosa, which is an immense mass of volcanic matter of a reddish colour, and on the south by Punti di San Giuseppe, forming a bight about 1¼ miles wide and three-quarters of a mile deep, but the available space for anchorage is very small, on account of the great depth of water. *See* view facing page.

Light (*Lat. 38° 29′ N., Long. 14° 58′ E.*).—At San Giacomo, north-east of the town, a *fixed red* light is shown, at an elevation of 126 feet above the sea, from an iron support, on a small tower on top of a house with a red front, and 22 feet in height; it is visible in clear weather from a distance of 4 miles. For arc of visibility, *see* Light list and plan.

Mooring buoy.—There is a mooring buoy, in 25 fathoms water, about a cable north-east of Punta Scaliddi.

Anchorages.—The water off the town is very deep, there being from 30 to 50 fathoms close in, except in front of the beach north of the town, where there is a reef with 3½ fathoms water over it; between which and the castle small vessels lie with anchors in 12 or 14 fathoms water, and stern-fasts to the shore. The small craft of the island moor south of the castle, off the pratique office mole, and fishing boats are hauled on the beach in the cove, a little farther south. At the head of the bight is the anchorage of Casa Bianca, which may be used by large vessels; the bottom is good, but the anchorage is exposed to south-easterly winds. A notice board points out the anchorage prohibited on account of the telegraph cable.

Town.—The town of Lipari stands on a steep declivity on the southern side of the bay: it is crowded, irregular, and dirty, with narrow streets and ruinous public edifices, of which last the finest are the Capuchin convent, a hospital, a nunnery, and the bishop's palace. The castle, which encloses the cathedral and some other edifices, is

No. 610.—Lipari—Alteration in Lighting.

1. Alteration in characteristics of light:

Position.—At San Giacomo.

Lat. 38° 28¾′ N., long. 14° 57½′ E.

Details.—The fixed red light has been replaced by a light having the undermentioned characteristics:

Character.—An *occulting red* light *every twenty-four seconds*, thus:—

Light,	eclipse.
16 secs.	8 secs.

Visibility.—6 miles.

Remarks.—The other characteristics of the light remain unaltered.

2. Light established:

Position.—At Marina Corta.

Details:

Character.—A *fixed green* light with a *fixed white* sector showing over the quay to the north-westward of the light.

Elevation.—20 feet.

Visibility.—3 miles.

Structure.—Iron pillar.

Note.—The exact position of this light is not known; the light is to be placed on the charts at the outer end of the Health Office pier and marked "*posn. approx.*"

Chart No. 172. Med. 1, p. 604.

No. 610.—Italy.—Alteration in Lighting.

1. Alteration in characteristics of light:

Position.—At San Giacomo.

Lat. 38° 28¼' N., long. 14° 51¼' E.

Details.—The fixed red light has been replaced by a light having the undermentioned characteristics:

Character.—An occulting red light every twenty-four seconds, thus:—

Light.	eclipse.
16 secs.	8 secs.

Visibility.—8 miles.

Remarks.—The other characteristics of the light remain unaltered.

2. Light established:

Position.—At Marina Corta.

Details:

Character.—A fixed green light with a fixed white sector showing over the quay to the north-westward of the light.

Elevation.—20 feet.

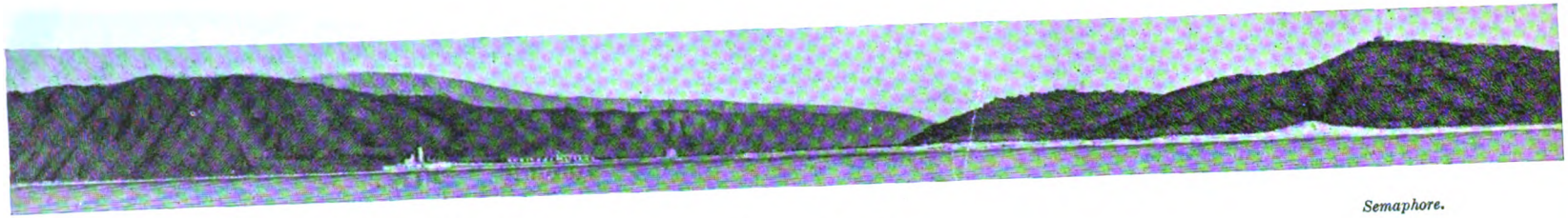
Visibility.—3 miles.

Structure.—Iron pillar.

Note.—The exact position of this light is not known; the light is to be placed on the chiarta at the outer end of the Hea[illegible] Office pier and marked "[illegible] approx."

Chart No. 172. Med. 1, p. 60.

To face page 604.]



Calabria. *Lighthouse, bearing 146° true.* *Semaphore.*

Capo Peloro or di Faro.

Town.
Monte Sant' Angelo.
Casa Bianca.
Lighthouse, bearing 349° true.
Monte Rosa.
Panaria.

Rada di Lipari.

Old lighthouse,
Punta Bandiera.
Panaria.

Vulcano.

Plan of Lipari anchorage on 172. Var. 7° 30′ W.

erected in a commanding situation on the summit of a huge volcanic rock. There is a college, and under its superintendence are several schools in different parts of the islands. The population is about 15,400. Lipari is a penal settlement; about 400 convicts are generally stationed there. A British Vice-Consul is resident at Lipari.

Communication.—Steamers run daily to Milazzo and Salina; twice a week to Messina and Stromboli; and fortnightly to Filicudi; there are also frequently steamers to Naples; telegraphic communication with all parts. The telegraph office is open till 9 p.m.

Supplies of fresh provisions in very limited quantities may be procured, and water is scarce, every house having its own cistern.

Hospitals.—There is a civil, and a military, hospital.

Trade. — Two large, but unequal plains are well cultivated, producing fine fruit, cotton, pulse, olives, and vegetables, besides a three months' supply of corn for the island. The Malmsey wine from these plains is well known for its delicious flavour. Lipari has an active trade with the other islands, also with Messina, Palermo, Naples, &c. The principal exports are ground pumice stone, cloth, wine, fruit, and vegetables.

Shipping.—In 1910, 878 steam vessels, with a total tonnage of 208,352 tons, entered the port, and 177 sailing vessels, with a total tonnage of 5,631 tons.

Submarine telegraph cables are laid from Lipari to Salina, Vulcano, and Panaria.

Chart 172, Lipari islands.

VULCANO (*Lat. 38° 24′ N., Long. 14° 58′ E.*) (ancient Hiera or Vulcania), lying about 4 cables to the southward of Lipari, is 4¼ miles in length, 2 miles in breadth, with an irregular outline of 14 miles, and is elevated 1,601 feet above the sea. It is wonderfully marked by volcanic action, and contains a variety of pumices, salts, and sulphur in all its different states, with lavas and vitrifications. The interior is mostly a sterile valley of powdered cinders, much too warm for cultivation. A large portion of the eastern coast is a precipitous mass of lava, scoriæ, pumice, and ashes, of the most sterile and forbidding aspect.

Near the western side of the island is Monte Saraceno, the highest part of the island, and a mile northward of it is Solfatare, the great active crater, which is separated from the neighbouring hills by a deep valley.

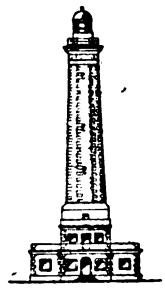
Monte Vulcanello, the north part of the island, forms a peninsula, and is connected to the main portion by a low, rocky formation of its own lava, with a bay on each side. This piece of land is said to have

Chart 172, Lipari islands. Var. 7° 30′ W.

emerged from the sea about 180 years B.C.; it has two craters, neither of them large; one is extinct and fast filling up, but from the other a rumbling noise is sometimes heard, and it frequently emits smoke.

The southern coasts of the island yield grapes, flax, barilla, vegetables, pulse, and fruit, and the best corn in the islands except that of Alicudi. As the land rises to the acclivity of the mountain, a slight vegetation of lichens and dwarf shrubs affords food to several large flocks of goats; there is a spring of good water about the middle of this ground. On Punta Santa Rosario, about a third of a mile westward of the present lighthouse, is the old lighthouse, about 460 feet above the sea. *See* view, page 604.

LIGHT (*Lat. 38° 22′ N., Long. 15° 0′ E.*).—On Punta Praia dei Porci, south coast of Vulcano, an octagonal tower, surmounting a dwelling, 134 feet in height, exhibits, at an elevation of 148 feet above the sea, a *fixed* and *flashing white* light *every two minutes*, thus:—fixed, *seventy-three seconds;* partial eclipse, *twenty seconds;* flash, *seven seconds;* partial eclipse, *twenty seconds;* it is visible in clear weather from a distance of 18 miles. For arc of visibility, *see* Light list and chart.



Punta Praia dei Porci lighthouse.

Submarine telegraph cable. — A telegraph cable connects Vulcano and Lipari.

Anchorages. — The western bay of Vulcanello, or Porto di Ponente, is picturesque, and affords anchorage for small vessels in 2½ fathoms water, over black sand, but it is exposed to north-west winds, which, in winter gales, send in a heavy sea; there is a rock on the west side of the entrance. A mile westward of the port is Capo Grosso, an abrupt mass of lava, with 10 fathoms water close to it. Between this point and that of Monaco is a cove, with a rock in the centre, resorted to by fishermen during scirocco or southerly winds. Thence the coast southward is irregular, bold, and craggy; at 1¼ miles beyond Punta Monaco is a steep detached rock, with deep water between it and the land.

When a north-west wind sets into Porto di Ponente, a vessel can easily shift round to Porto di Levante on the east side of Vulcanello, where she can lie in security nearly under the small crater; in this bay are a few cottages and a chapel. At the anchorage in the eastern bay, internal rumblings like distant thunder may be heard, and on these occasions the clouds arise from the great crater with greater activity and density.

General charts 1976, 165, 1800, 676, 1440, 2158a, b, 449.

Chart 172, Lipari islands. Var. 7° 30′ W.

Soundings.—Deep water surrounds both Vulcano and Lipari; above a mile north of the latter there is a depth of 26 fathoms, with a bottom of rock and coral; between it and the shore there is a depth of above 70 fathoms, and off the east side of the islands, and to the south and west of Vulcano there are from 200 to 300 fathoms, at about a mile off. There are the same depths westward of Secca di Bagno, decreasing towards the passage of Salina.

The channel between Lipari and Vulcano is 4 cables wide, and has from 13 to 25 fathoms water in mid-channel.

Panaria (*Lat. 38° 38′ N., Long. 15° 4′ E.*) (ancient Euonymus) lies east-north-eastward, distant 9¼ miles from the north-east point of Salina, is 1½ miles in length in a north-easterly and south-westerly direction, a mile in breadth, and 1,430 feet above the sea; its form is oval, with a coast of 4½ miles in circuit. The island had warm baths named Thermisia by the Romans, and the numerous vestiges prove it to have been a place of consideration; it has a population of about 1,000.

The soil is rich and well cultivated, particularly on the east side, and produces wheat, barley, fruit, oil, wine, pulse, and soda. Fishing is a profitable employment. There is a church and village on the eastern coast, and on the south-east side of the island a chapel and a small bay with a beach of yellow sand, the only sand of the kind in all the islands.

The coast around Panaria is bold; Scoglio della Nave lies a short distance off the northern end, and round to the westward, at a mile from the shore, the depth is over 60 fathoms.

Communication.—There is telegraphic communication with all parts at limited hours.

Supplies.—A number of cattle are bred on the island, and fresh provisions may be procured in small quantities, also a very limited supply of water from cisterns; there is a mineral spring near San Pietro church.

Submarine telegraph cables are laid to Lipari and to Stromboli.

Scoglio Formiche, nearly awash, lies nearly half a mile off the centre of the east side of the island, or one mile eastward from Punta Milazzese, its southern point.

Anchorage.—Vessels may anchor either north or south of Scoglio Formiche in from 10 to 15 fathoms water, over good holding ground, but must be prepared in winter for on-shore winds. Small vessels find snug anchorage in the sandy bay before-named.

General charts 1976, 165, 1800, 676, 1440, 2158a, b, 449.

Chart 172, Lipari islands. Var. 7° 30′ W.

Basiluzzo (*Lat. 38° 40′ N., Long. 15° 7′ E.*).—About 2 miles to the eastward and north-eastward of Panaria is a cluster of islets and rocks; the north-easternmost and largest of which, named Basiluzzo, about a mile in circumference, is shaped like a wedge with steep sides on the west. Off its western side is Spinazzola, an islet with a tabled surface, tolerably cultivated, producing corn, flax, and vegetables, and having on it vestiges of ancient buildings.

Dattilo, about a mile eastward of Panaria, is a white steep rock of lava, in a state of partial decomposition. In this curious mass there are many little cavities, in which the inhabitants of Panaria place their rude but profitable beehives; the channel between Dattilo and Panaria has from 20 to 30 fathoms in it.

Close to the north-east of Dattilo is a cluster of black rocks, named Panarelli; and beyond them, half a mile from Dattilo, is a rocky shoal on which is 2¾ fathoms water.

Lisca Bianca is a rocky islet of a light colour, about 1¾ miles eastward of Panaria, and though small is partially cultivated. On its south-west are Bottaro and Lisca Nera, islets with shallow water between and around them. Between Lisca Bianca and the islet next to the south-west, Captain Smyth, in April, 1815, found a strong smell of sulphur, and in two places were springs of sulphureous gas, the bubbles of which rose in quick and constant succession to the surface, and where they have been known to flame on bursting into the atmospheric air. Rocks with 3 feet water on them lie about 1¾ cables to the south-east of Lisca Nera.

Secca dei Pesci, a rocky bank with from 17 to 30 fathoms water over it, lies south-eastward, distant 3 miles from Punta Milazzese, Panaria.

STROMBOLI, the ancient Strongyle, and the north-eastern island of the Æolian group, lies 10 miles north-eastward of Panaria, or 7¾ miles from Basiluzzo. It is about 8 miles in circumference, conical, and rises 3,035 feet above the sea, and from every indication seems to be the entire product of subterranean fires. The crater, which faces the north-west, is about one-third down the side of the mountain, and continually burning, with frequent explosions, and a constant ejection of fiery matter; it is of a circular form, and about 170 yards in diameter.

Even with this stupendous volcano existing, Stromboli is extremely fertile, having a fine verdure in the cultivated parts, and these, on one side, extend high up the mountain. The soil is a black mould, composed of argillaceous tufa, scoriæ, pozzolana, and sand. The hedges are of cane reeds, which when sufficiently strong are cut down, and

Chart 172, Lipari islands. Var. 7° 30′ W.

used as supporters for the vines. The products are some of the finest wines in the Mediterranean, and a moderate quantity of wheat, barley, cotton, raisins, currants, and figs; the population is about 4,000.

Anchorage.—Temporary anchorage, in a depth of 12 fathoms, can be found in the channel between Stromboli and Strombolicchio.

Towns.—There are three towns, or villages, viz., San Vincenzo, at the extreme north-east of the island; San Bartolomeo, on the north coast, and Ginostra, on the south-west side; the houses are generally low, with flat roofs, though there are a few of two storeys, and even vestiges of ancient buildings and sepulchres may still be seen. San Vincenzo is the most important town, and the beach below the houses is a black shining sand, terminating in a rocky point, where there is a large cavern, named the Grotto delle Bovi Marini, or seal's cave, which is 86 feet long, 35 feet at the entrance, and 7 feet high.

Communication. — Steamers from Messina and Lipari call weekly and fortnightly respectively; telegraphic communication with all parts at limited hours.

Supplies.—Moderate supplies of fresh provisions and water may be procured, the latter being purchased from private cisterns.

Submarine telegraph cables.—Stromboli is connected with Panaria by a telegraph cable.

Coasts. — The north extreme of the island is formed of rugged lava, and a little to the south-west of it there are some rocks awash, but close in. The north-west side of the island forms a slight bay, where, immediately under the crater, incessant showers of red-hot stones from the volcano frequently fall. The western coast of the island is of rugged lava, and here will be seen the village of Ginostra, with a few houses and a church.

Punta del Monaco (*Lat. 38° 46′ N., Long. 15° 13′ E.*), the south extreme, is a low shingle point, and along the coast thence to San Vincenzo, there are several caves; one of these a little way up the hill above Punta del Uomo, is remarkable as the place where the bright and beautiful mineral named specular iron is found. There are no outlying hidden dangers around the island, and except at the north-east extreme the water is everywhere deep close in; there is a depth of from 100 to 200 fathoms within half a mile of the coast.

Strombolicchio, about 9 cables north-eastward of Punta della Lena, the north-east point of Stromboli, is a steep rock or mass of indurated pozzolana, 164 feet above the sea, which appears from a

General charts 1976, 165, 1800, 676, 1440, 2158a, b, 449.

Chart 172, Lipari islands. Var. 7° 30′ W.

distance like a ship with studding sails set. There are from 7 to 35 fathoms water between it and Stromboli.

Current. — In the channel between Stromboli and Basiluzzo a current setting to the westward at the rate of one mile an hour has been experienced, a moderate north-easterly breeze blowing at the time.

Plan 177, The Faro or Strait of Messina.

NORTH COAST OF SICILY.—The north coast of Sicily is generally free from hidden danger; the prevailing winds are between south-west and north-west, and are preceded by a swell; the gales, when they occur, blowing home. During fine weather, the current usually sets to the westward at the rate of a quarter to three-quarters of a knot an hour, and is stronger near the shore than in the offing; at other times the current is much influenced by the wind.

Coast. — From Capo Peloro, the north coast of Sicily as far as Capo Rasocolmo, 6½ miles distant, is a sandy beach; at intervals there are towers and other buildings, and on the spur of a ridge over Pantano Piccolo is Spuria semaphore, already mentioned. These towers are erected at intervals on prominent points all round the coast, and were formerly for observation and defence; they are about 50 feet high, generally square, with turrets at the angles. Towards the western part of this coast are several rivulets, the chief of which is the Corsari. Acquarone village is situated to the eastward of the entrance.

Modeste bank. — For 1½ miles from Capo Peloro the beach is bordered by a bank, at the distance of about 2 cables, but from the village of Mortelle, the edge of the bank trends in a north-north-west direction, gradually increasing its distance from the shore to 1¼ miles. The general depths on the bank (except near the shore) are from 3½ to 5 fathoms, but near the outer edge there are two patches with 2½ and 3 fathoms water over them.

Modeste shoal (Secca di Rasocolmo) (*Lat. 38° 18′ N., Long. 15° 35′ E.*), the northern patch, with 2½ fathoms water over it, is nearly a cable in extent, and lies 58° true, distant 1$\frac{2}{10}$ miles from Acquarone village. Along the edge of the bank outside these shoals there are depths of from 10 to 24 fathoms. Capo Peloro lighthouse bearing southward of 130° true, or the lighthouse in line with Torre Cavallo (if visible) on the Calabrian coast, or, at night, Punta Mazzone light in sight leads to the northward of these dangers.

Anchorage.—Off the fishing village of Acquarone it is said there is good anchorage; at half a mile to the north-west there are 5 fathoms

General charts 188, 1976, 198, 165, 1800, 1440, 2158a, b, 449.

Plan 177, The Faro or Strait of Messina. Var. 7° 30′ W.

water, and at a mile in the same direction depths of from 12 to 20, over stiff muddy bottom; the position will be further identified by a high mound of white sand, a little eastward of the village.

Chart 188, Catania to Cefalu.

Capo Rasocolmo, about 6½ miles west-north-west of Capo Peloro, is the eastern termination of fertile tableland of moderate elevation, with several sandhills under it, and some low rocks (Pietra del Rais) at its base; on the extreme point are the remains of a Saracenic tower. The steep shore is fronted by a margin of sand, and may be approached from the northward and westward to within half a mile, where a depth of 5 fathoms will be found; at a mile off, in the same direction, there are 26 fathoms; and at 4 miles, from 100 to 150 fathoms, over sand and mud.

Coast. — The range of hills, the foot of which recedes from the coast to the westward, as also near the outlet of some of the larger torrents, slopes from elevations of from 1,000 to 1,200 feet above the sea, and is broken by numerous watercourses and studded with small towns and villages, around which is much rich and beautiful cultivation.

On the slope of the hill, 4½ miles south-west of Torre di Rasocolmo, is the town of Gesso. On the coast, about 8 miles from Capo Rasocolmo is the beautifully situated town of Spadafora (Spadaforo San Martino), with its palace, and 2 miles west is the large Torrente Nocito, about which is a quantity of marshy land, and the low ground increases hence to the peninsula; 2½ miles farther is Torrente Santa Lucia (del Mela), whence a low, sandy coast curves for 1¾ miles to the neck of Penisola di Milazzo.

Communication.—There is a telegraph station at Spadafora.

Supplies. — Moderate supplies of fresh provisions may be procured; water is abundant, but not very good.

Anchorage. — There is temporary anchorage off Spadafora old palace, in about 11 fathoms water, over sand and mud, at about 7 cables from the shore; a small vessel may go closer in with 3 fathoms about 3½ to 4 cables from the shore.

Plan 175, Milazzo bay.

BAIA DI MILAZZO (*Lat. 38° 13′ N., Long. 15° 15′ E.*).—Penisola di Milazzo, which projects more than 3½ miles to the northward, appears from a distance like an island, the isthmus connecting it with the mainland being low and level. The distance across the isthmus is a third of a mile; the peninsula is backed by Mount

General charts 1976, 165, 1800, 1440, 2158a, b, 449.

Plan 175, Milazzo bay. Var. 7° 30′ W.

Ætna, and the high range of hills running along the north side of Sicily. Baia di Milazzo is the bight on the south-eastern side of the peninsula.

The citadel, 367 feet above the sea, on a rocky elevation at the south end; Monte Trino, 483 feet, a round, thickly-wooded hill in the middle; and the lighthouse, with several towers and a mill, show conspicuously above the rest of the land, which is level, thickly wooded with olive trees, and well cultivated, with vineyards. On a nearer approach, the houses of the lower town on the east side of the isthmus and south of the citadel, the mole lighthouse, a high chimney south of it, and the numerous towns and villages on the northern spurs of the Sicilian hills, come into view. *See* view facing page.

The coasts of the peninsula are steep, and in parts precipitous, the east side being thickly wooded, and, except where precipitous, carefully cultivated. On the north and west sides the coast is more rocky, rugged, and barren, but from Punta Fascina (del Tono), half a mile south of Monte Trino, a steep pebble beach, with deep water close-to, on which a heavy sea sets in with westerly winds, extends to the south-south-westward.

LIGHT (*Lat. 38° 16′ N., Long. 15° 14′ E.*).—The lighthouse, near Capo Milazzo, at the north extreme of the peninsula, and on an eminence slightly elevated above the surrounding land, is a white circular tower, 34 feet in height, and adjoining a dwelling; it exhibits, at an elevation of 294 feet above the sea, an *alternating fixed white* and *flashing red* light *every ninety seconds*, thus:—fixed white, *seventy-three seconds;* eclipse, *five seconds;* red flash, *seven seconds;* eclipse, *five seconds;* in clear weather the light is visible from a distance of 14 miles.

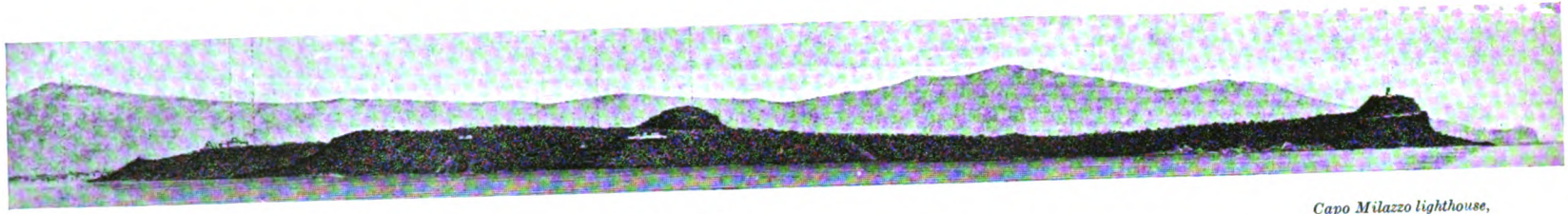
Cape Milazzo lighthouse.

Beacon rock (Croce di Mare) is the extreme rock of a ledge extending 40 yards from a point on the east side of the peninsula, immediately north of the town. The rock is 4 feet above the sea, and has a small white building (shrine) on it, which shows clearly as the anchorage is approached.

Shoal.—A shoal with 4¼ fathoms over it lies on the south side of the bay, about 2½ cables from the shore, and 7 cables eastward of the entrance to the port.

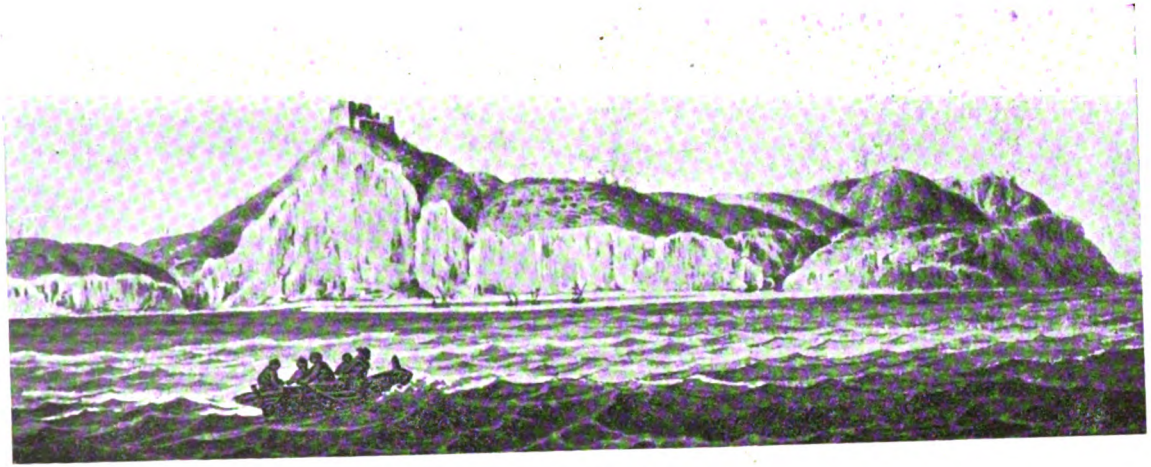
General charts 188, 1976, 165, 1800, 1440, 2158a, b, 449.

To face page 612.]



Milazzo. *Citadel.* *Punta Belvedere.* *Monte Trino.* *Capo Milazzo lighthouse, bearing 261° true.*

Penisola di Milazzo.



Capo Tindaro.

Plan 175, Milazzo bay. Var. 7° 30′ W.

Tunny fisheries.—Tunny nets are laid out during the season, from March to November, from the eastern coast of the peninsula, as follows:—

From the northern part of the small bight southward of Beacon rock, eastward, for a distance of 1½ cables.

From Punta Belvedere, 8 cables north of Beacon rock, eastward, for a distance of 2 cables.

From Punta Ruolo (Punta Ponte delle Scale), eastward, for a distance of 3 cables.

The outer end of these nets is marked, by day, with a buoy surmounted by a cylindrical topmark, with black and white stripes; and at night by a *red* light over a *white* light. *See* also Caution, page 73.

Anchorage (*Lat. 38° 13′ N., Long. 15° 15′ E.*).—An outer anchorage may be taken up in 16 fathoms water, over muddy bottom, about 1½ cables north-eastward of the north molehead. The sandy beach forming the shore from Milazzo eastward may be approached to a prudent distance, the 5-fathoms contour line being within a quarter of a mile of the shore, and from 25 to 30 fathoms at the distance of half a mile; the coast of the peninsula, northward of Punta Belvedere, should not be approached within 2 cables.

In the winter several torrents discharge their thick, muddy waters along the coast, but owing to the water being deep nearly close-to, there is little or no shallow deposit at their mouths. The anchorage is well protected from all but north-easterly winds, which, however, do not blow home with much force, but the wind from the above quarter sends in a considerable sea, which is accompanied by an offshore swell.

The appearance of the Marina, which is only 3 or 4 feet above the level of the sea, would suggest that no very heavy sea breaks against it.

A sailing vessel, seeking shelter in a south-west gale, may anchor in from 10 to 11 fathoms water, over sand, east-south-east of Punta Battista (Mazza), with the lighthouse bearing 278° true.

Current.—The current sets round the bay, from the eastward, past the mole and Beacon rock, to the northward.

Port.—The port, near the south end of the peninsula, is formed by a small mole, which projects about 400 yards to the south-east, and about 100 yards in an easterly direction; it is also sheltered by a mole which extends in a 46° true direction from the shore near Tonnara San Giovanni, for a distance of 250 yards. This mole affords protection against the swell which rolls along the coast with strong north-east winds.

General charts 188, 1976, 165, 1806, 1440, 2158a, b, 149.

Plan 175, Milazzo bay. Var. 7° 30′ W.

Depths.—There is a depth of from 12 to 30 feet in the entrance to the port. In the port there is a general depth of from 20 to 30 feet, except in the southern corner, where a bank with from 3 to 10 feet over it extends from the elbow, formed by the south mole, into the harbour for a distance of about 1¼ cables.

LIGHT (*Lat. 38°13′N., Long. 15° 15′ E.*). — On the extremity of the north mole an iron crane, 36 feet in height, exhibits, at an elevation of 40 feet above the sea, an *occulting green* light *every twenty-four seconds*, showing light for *sixteen seconds* and eclipse of *eight seconds;* it is visible in clear weather from a distance of 6 miles.

Buoy. — A spherical iron buoy is moored in 22 fathoms water, 27° true, distant 1½ cables from the mole lighthouse.

Submarine telegraph cable. — A telegraph cable is laid between Milazzo and the island of Lipari; its direction will be seen from the plan, and is also pointed out by a notice board, and vessels are prohibited from anchoring in its vicinity.

Mooring buoys. — About 2 cables west-north-westward of the mole lighthouse is a red cylindrical iron buoy, for the use of the coastal line of steamers; there are also two other red mooring buoys in the port.

Town. — The town of Milazzo (ancient Mylæ) is divided into upper and lower towns, both of which are irregularly built; and though it has a number of large edifices, none of them are remarkable. The churches, with the exception of that of San Francesco, are generally mean, and the convents poor; the population is about 16,200.

The town is principally distinguished by its fortifications, being strong by nature and art, as besides the subordinate fortifications, the citadel, on the highest part of the south end of the promontory, commands the town and port; beneath it is a spacious grotto, named the cave of Ulysses. In the summer months malaria prevails in the plains southward of the town. A British Vice-Consul is resident here.

Communication. — There is a daily service of steamers to Lipari, railway communication with Palermo and Messina, and telegraphic communication with all parts. The telegraph office is open till midnight.

Coal and supplies.—About 3,000 tons of coal are usually kept in stock. Vessels are coaled at the wharf, alongside which there is a depth of 22 feet.

Supplies of fresh provisions are sufficient, and good water is supplied in tank boats.

General charts 188, 1976, 165, 1800, 1440, 2158a, b, 449.

No. 370.—MILAZZO BAY—ALTERATION IN CHARACTERISTICS OF LIGHT.

Position.—On the head of the north mole at Milazzo.
Lat. 38° 13′ N., long. 15° 14¾′ E.

Details.—The occulting green light has been replaced by a light having the undermentioned characteristics:—

Character.—A *flashing green* light *every five seconds*, thus:—

$$\frac{\text{Flash,}}{\text{2 secs.}} \quad \frac{\text{eclipse.}}{\text{3 secs.}}$$

Elevation.—23 feet.

Visibility.—7 miles.

Structure.—25 feet in height; description not known.

Chart No. 175. Med. 1, p. 614.

Plan 175, Milazzo bay. Var. 7° 30′ W.

Hospital.—There is a hospital which admits strangers at a fixed charge.

Pilots may be obtained. The following are the rates of pilotage:—

Tons net registered	1 to 100	.....	13	lire.
„ „	101 „ 200	.....	18	„
„ „	201 „ 300	.....	24	„
„ „	301 „ 400	.....	30	„
„ „	401 „ 500	.....	37	„

„ „ 501 and over, 5 centisimi for every net registered ton in augmentation of 37 lire, but the total remuneration is not to exceed 50 lire.

Trade.—The district of Milazzo produces grapes, wines, olives, olive and solfuro oil, oranges and lemons, and the tunny fishery is an important industry; the fish, when preserved in oil, being chiefly exported to Genoa. There are also several flour mills.

Shipping.—In 1911, 1,089 steam vessels, with a total tonnage of 516,926 tons, entered the port, and 548 sailing vessels, with a total tonnage of 22,199 tons.

Six-fathom rock (*Lat. 38° 16′ N., Long. 15° 14′ E.*), 344° true, distant nearly 3 cables from Punta Mizzanisi (Gamba di Donna), the north-west extreme of the cape, is a 6-fathoms rocky patch, with deep water all round it; with this exception there are no dangers, and the shore may be approached to a quarter of a mile.

Baia Sant' Antonio, on the west side of Penisola Milazzo, affords well-sheltered anchorage, with easterly winds, in from 10 to 15 fathoms water, over sandy bottom. Close to the western extremity of the bay, and about a cable south of Punta Mizzanisi, are Scogli Porcelli, the largest being 30 feet above the sea. The 10-fathoms contour line passes about a cable from Punta Mizzanisi, which, together with the rocks, may be rounded at an equal distance.

Within half a mile northward, and the same distance from both sides of the peninsula, the depths are about 50 fathoms over a bottom of sand and mud.

Tunny fisheries.—Tunny nets are laid out during the season, from March to November, in Baia Sant' Antonio, southward of the lighthouse, they extend about one cable in a southerly direction; nets are also laid out at 7 cables southward of Punta Fascina (del Tono), extending about 5 cables in a westerly direction.

The outer ends are marked by day with a buoy surmounted by a cylindrical topmark, with black and white stripes, and at night by a *red* light over a *white* light. *See* also Caution, page 73.

General charts 1976, 165, 1800, 1440, 2158a, b, 449.

Chart 188, Catania to Cefalu. Var. 7° 30′ W.

GOLFO DI PATTI.—From Capo Milazzo lighthouse, Capo Calavá, the next most northerly projection, lies westward, distant 15¾ miles; the indentation between, named Golfo di Patti, is 7 miles deep, and bold to the sandy shore upon the eastern side. It is divided by Capo Tindaro into two bays, Oliveri and Patti.

From the inner end of Penisola Milazzo to the village of Oliveri, is a steep shingly beach, fronted by deep water, and on which the sea breaks heavily during westerly gales. The coast is bordered by a fertile plain, which is broken by several torrents; slightly elevated, at distances of 1½ and 2 miles, are the towns and villages of Meri, Barcellona, and Furnari.

Castroreale, the capital of the district, situated in a central position about 3½ miles from the coast, and built on the summit of a wall-sided hill, 1,330 feet above the sea, is conspicuous from seaward, and appears in the midst of several sharp peaks. Upon the coast to the westward of this portion of the gulf are two towers, Forte and Confone, besides fishing villages including that of Falcone, a mile eastward of Oliveri.

Communication.—There is a station at Barcellona, on the railway between Messina and Palermo, and telegraphic communication.

Baia di Oliveri (*Lat. 38° 8′ N., Long. 15° 4′ E.*).—In Baia di Oliveri, which is protected by Capo Tindaro from the westward, there is excellent anchorage in about 15 fathoms water, over stiff mud, about a quarter of a mile from the shore; the best berth is with Castello di Oliveri in line with the west part of the village, bearing about 226° true.

This anchorage may be advantageously resorted to by sailing vessels when obliged to bear up from the heavy westerly gales of winter, as it can always be fetched; whereas from the length of the promontory of Milazzo (exclusively of its being so much farther to leeward) vessels on rounding Capo Milazzo and being unable to fetch a proper berth to the eastward of the promontory have in consequence often been under the necessity of keeping away for the Strait of Messina.

Baia di Oliveri is in some degree sheltered by the Æolian islands, and by Secca di Tindaro, from the northerly sea, but should be quitted directly the wind shifts to the eastward of north. The small fishing village of Oliveri, with a castle and a tunny factory, is situated at the head of the bay.

Tunny fishery.—Tunny nets are laid out during the season, from March to November, a little to the northward of Oliveri village; they extend about 8 cables from the shore in a north-easterly direction. The outer end of the nets are marked by day with a buoy, sur-

Chart 188, Catania to Cefalu. Var. 7° 40′ W.

mounted by a cylindrical topmark, with black and white stripes, and at night by a *red* light over a *white* light. *See* also Caution, page 73.

Capo Tindaro.—From a mile beyond Oliveri, the coast becomes high and cliffy to Capo Tindaro or Tyndaris, conspicuous 1½ miles to the north-west; upon a summit are some ancient vestiges, a monastery, 920 feet above the sea, and a tower near the extreme of the point. *See* view, page 612.

Secca di Tindaro.—The outer part of this shoal extends eastward 6 cables from Capo Tindaro, and has depths of from 2 to 3 fathoms over sand. The sharp cone of Rocca Novara open east of the village of Falcone, bearing 158° true, leads eastward of the shoal.

Porto Madonna is formed by a dry sand-pit extending from the eastern side of Capo Tindaro. It consists of a basin about 60 yards in diameter, has a depth of 6 feet, and is thus only suitable for boats. North-east gales are said to cause a temporary closing of the entrance.

The sands of Secca di Tindaro and Porto Madonna owe their formation to the currents that set past the cape. With north-westerly gales; the waters driven round the shores of Patti are charged with sand, which, meeting with the eddy from Oliveri, is deposited on the bank.

Baia di Patti. — Between Capo Tindaro and Capo Calavá, 6½ miles to the north-westward, is Baia di Patti, the shore of which may be approached by the lead; the water is deep with regular soundings, over a bottom of sand and clay. Near the centre of the bay, half a mile north of the Fiumara Tinieto, is a large conical, brown rock, Pietra di Patti, 45 feet above the sea, with a rock awash, Scogli di Patti, a cable eastward of it.

The channel between the rocks and beach has a depth of 14 fathoms, and affords summer anchorage. It is necessary, however, to sight the anchor every third or fourth day, as the sand is apt to bank up, particularly after a breeze.

La Marina di Patti is a large village consisting of a long stretch of houses on the seashore, and is a dependency of the town of Patti, which stands on an eminence, at the base of a kind of mountainous amphitheatre, in a picturesque country at the head of the bay, and contains a population of about 10,000. The town is tolerably well built, has the remains of a Norman castle, and a cathedral; there is a manufactory of earthenware, a fishery, and westward of the houses of La Marina a steam mill, which is a conspicuous red building with a large chimney.

Light (*Lat. 38° 9′ N., Long. 14° 58′ E.*).—At La Marina di Patti, and about 70 yards from the coast, a *fixed red* light is exhibited, at an

General charts 1976, 165, 1800, 1440, 2158a, b, 449.

Chart 188, Catania to Cefalu. Var. 7° 40′ W.

elevation of 17 feet above the sea, from a white column, 11 feet in height; it indicates the anchorage, and is in clear weather visible from a distance of 3 miles.

Rock.—A rock awash lies three-quarters of a mile to the north-west of Patti lighthouse, and half a cable from the shore.

Buoy. — A white mooring buoy lies in 8 fathoms water abreast the lighthouse, for the use of the mail steamers.

Anchorage.—A vessel may anchor off any part of this coast in 10 fathoms water, over sand and mud. The soundings are regular, deepening gradually to 100 fathoms at 2 miles distant.

Communication.—There is a railway station at Patti on the line between Messina and Palermo, and telegraphic communication at limited hours.

A fine road leads from La Marina di Patti to pass among the hills, named Scala di Tindaro (on the summit of which are the remains of the ancient city of Tyndaris) and thence down the hill to the village of Oliveri.

Supplies of fresh provisions can only be obtained in small quantities, but an abundance of good water may be procured from a public fountain.

Capo Calavá (*Lat. 38° 12′ N., Long. 14° 55′ E.*), the western boundary of the Golfo di Patti, is a sharp, bold projection from a ridge, which at a distance of about a mile falls from Monte Pezzecatori, an elevation of 1,742 feet above the sea. A short distance off the cape, and to the eastward, are a few rocks above water, and on the west side is a sandy bay. The water deepens to 100 fathoms at half a mile distant.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from the mouth of a torrent about a mile south-eastward of Capo Calavá; they extend for a distance of about 5 cables in a north-easterly direction. The outer end of the net is marked, by day, with a buoy surmounted by a cylindrical topmark with black and white stripes, and at night by a *red* light over a *white* light. *See* also Caution, page 73.

Coast. — The coast between Capo Calavá and Capo Orlando, a distance of 8 miles, is high, broken by many torrents and streams; there is some well-cultivated ground, and several villages on the coast, including that of Gioiosa Marea, 1½ miles westward of the cape. About a third of the distance from Capo Calavá is Punta Piraino, upon which is Torre Ciavoli; a short distance within, on an elevation

Chart 188, Catania to Cefalu. Var. 7° 40′ W.

1,365 feet above the sea, is the town of Piraino, exporting oil, wine, and corn.

Brolo castle and village is $1\frac{3}{4}$ miles farther west, near a stream of the same name; the castle is a ruinous structure on a steep cliff, in a fertile valley.

Scoglio di Brolo, about a quarter of a mile from the shore, abreast of the castle, is about 16 yards in circumference and 45 feet above the sea, with 9 fathoms water between it and the shore; but the passage should not be used, as there is a reef awash and a sand-bank to the westward of the rock, about half-way to the shore.

Punta di Testa di Monaco, 2 miles westward of Scoglio di Brolo, is fringed by rocks to a distance of 2 cables.

Anchorage. — In this locality, Captain Smyth remarks: "I have found good riding even in winter; although it is exposed from N.W. to N.E., yet the most troublesome winds are those from the southward, and they blow with great violence from the height on which stands the town of Piraino."

San Gregorio (*Lat. 38° 9′ N., Long. 14° 47′ E.*).—A short distance to the eastward of Capo Orlando are two small, projecting rocks, jutting out like moles, where small country vessels at times anchor. In the bight beyond it is the village of San Gregorio, a landing place for timber, with anchorage tolerably protected from westerly winds, but open to the northward. To the eastward the country is more mountainous, but not less pleasing and fertile.

Naso.—The walled town of Naso stands on the site of the ancient Agathyrnum, a hill, 1,630 feet above the sea, about 3 miles to the south-east of the cape, in a fine wooded neighbourhood, with some houses on the coast below it. The Fiumara di Naso, dry in summer, is crossed by two bridges.

Communication. — There is a railway station at Naso on the line between Messina and Palermo, and telegraphic communication.

Tunny fishery. — Tunny nets are laid out during the season, March to November, at San Gregorio, about 8 cables south-eastward of Capo Orlando; they extend $1\frac{1}{2}$ miles in a north-easterly direction, from the shore. The outer end of the nets are marked, by day, with a buoy, surmounted by a cylindrical topmark with black and white stripes, and at night by a *red* light over a *white* light. *See* also Caution, page 73.

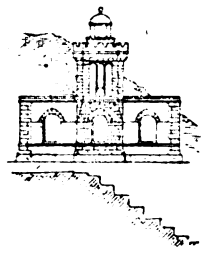
Capo Orlando, 328 feet above the sea, is steep, rugged, and conical, with a church and old place of interment on it, resembling a castle. It terminates in rocks, and a dangerous reef, just above water,

General charts 1976, 167, 1800, 1440, 2158a, b, 449.

Chart 188, Catania to Cefalu. Var. 7° 40′ W.

extends westward of it half a mile. Between the reef and beach, the bottom is foul and affords no anchorage, and this locality is remarkable for sudden squalls and heavy swells. A small village lies near the coast a little westward of the cape.

LIGHT (*Lat. 38° 10′ N., Long. 14° 45′ E.*). —On Capo Orlando a *fixed white* light is exhibited, at an elevation of 88 feet above the sea, from an octagonal-shaped tower surmounting a yellow dwelling, the whole being 35 feet in height; it is visible in clear weather from a distance of 12 miles.



Capo Orlando lighthouse.

Coast.—From Capo Orlando to the westward the coast is an extensive bold, sandy beach. A round peak, named Marco, about 3 miles to the south-west of Capo Orlando, and 1,030 feet above the sea, is conspicuous.

The town of Sant' Agata di Militello, with about 7,600 inhabitants, stands on the beach of a level, fertile country, and 7 miles south-westward of Capo Orlando, eastward 1½ miles of it is the Fiumara Rosmarino, a beautiful torrent, the banks of which are covered with mulberries, oleanders, and myrtles; higher up in its course are the remains of a massive Roman bridge. There are several other streams, and the towns of Rosmarino, San Marco d'Alunzio, and Frazzano are on the hills. Fiumara Rosmarino is three-quarters of a mile broad at its mouth, and is conspicuous.

Communication. — There is a railway station at Sant' Agata di Militello, on the line between Messina and Palermo, and telegraphic communication at limited hours.

Supplies. — Ordinary supplies of fresh provisions may be procured.

CAUTION.—All the fertile plains on this part of the coast are much subject to miasma.

None of the streams afford water fit for drinking; they are all polluted by various causes, such as dye-works, &c.

Caronia. — From Sant' Agata di Militello a coast of similar character continues for 9 miles in a westerly direction to the low, broad projection lying between La Marina di Caronia and the river of the same name. The little town of Caronia is on the summit of a rugged hill, 990 feet above the sea; it lies on the skirts of a forest, and is protected by a castle.

General charts 1976, 165, 1800, 1449, 2158a, b, 449.

Chart 188, Catania to Cefalu. Var. 7° 50′ W.

Communication.—There is a telegraph station at La Marina di Caronia, and the office is open at limited hours.

Supplies.—Small supplies of fresh provisions may be obtained.

Scogli Bidozza and Chiappa, distant 3 and 1¼ miles, respectively, eastward of Caronia, consist of several rocks above water, but all are close inshore.

The 10-fathom line between Capo Orlando and Caronia extends about three-quarters of a mile from the beach, and the 50-fathom line which lies half a mile from Capo Orlando gradually extends to 5 miles off Caronia; on the edge of the 50 fathoms, 5½ miles north-eastward of Caronia, is Secca di Caronia, a bank with a least depth of 38 fathoms over it.

San Stefano di Camastra, situated 4½ miles westward of Caronia, has a remarkable municipal palace, situated on a green eminence of vines and olives, to the eastward of the houses which form the marina.

Communication.—There is a station on the railway between Messina and Palermo, and telegraphic communication. The telegraph office is open till 9 p.m.

Supplies of fresh provisions are very limited, but good water may be obtained from a fountain near the railway station.

Tusa.—Punta Tusa, 4½ miles westward of San Stefano di Camastra is of rugged rocks, jutting from the shore; it is foul for half a cable distant. The Fiumara di Tusa a mile eastward of the point is crossed by a bridge of masonry, and the Fiumara di Pollina, 3½ miles westward, by a similarly constructed bridge with five arches. Near La Marina di Tusa is a tower, and 2 miles within is the town of Tusa.

Capo Finale (*Lat. 38° 2′ N., Long. 14° 9′ E.*), 5 miles westward of Punta Tusa, is a prominent headland, upon which is a tower; around its base are a few rocks, but the water is deep a short distance out, with from 20 to 30 fathoms a mile off. The village of Finale standing on the shore, three-quarters of a mile eastward, and Castello de Pollina upon a commanding eminence, 2,080 feet above the sea, 2¼ miles to the southward of the cape has a conspicuous tower north-east of the houses, and forms a good mark.

Coast. — Between Capo Finale and Capo Cefalu, a distance of 5½ miles, deep valleys break through the high land of the interior, down which flow many torrents, the chief of which are those of Malpertuso and Carbone, about a mile upon each side of a central projection, named Punta Sant' Ambrogio. Sailing vessels near this part of the coast, with off-shore winds, should be prepared for squalls through the valleys. The Malo Pertuso, or Bad Hole, one of these gorges,

Chart 188, Catania to Cefalu. Var. 7° 50′ W.

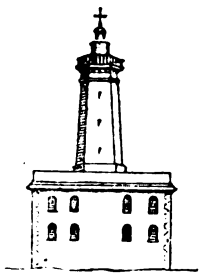
from which the gusts rush with much force, is the outlet of the Carbone before named, 2 miles south-eastward of Capo Cefalu.

Capo Cefalu (*Lat. 38° 2′ N., Long. 14° 2′ E.*) is low, and projects from a high, conical mount, upon which are the ruins of an old castle; to the eastward, about half a mile, is a sharp, steep projection, Capo Caldura, surmounted by Torre Caldura, and in the small bay between, some shelter is afforded to coasters.

The fortified seaport of Cefalu (the ancient Cephalœdium) lies upon the western extreme of the head; it is surrounded by walls of immense blocks of stone, and contains a cathedral and several churches. The rocky heights of Monte Sant' Angelo rise to an elevation of 3,480 feet above the sea, at about 3½ miles south of the town.

A small mole is built on the rocky point at the north-west extreme of Capo Cefalu, and affords partial shelter to boats. Nearly 2 cables north-westward from the molehead is a rock with 8 feet water over it.

LIGHT. — From a white octagonal tower, surmounting a white house, 86 feet high, erected on the north-eastern extremity of Capo Cefalu, is exhibited a *flashing white* light *every thirty seconds*, showing thus:—flash, *one and a half seconds;* eclipse, *twenty-eight and a half seconds;* this light is elevated 262 feet above the sea, and visible from a distance of 22 miles in clear weather.



Capo Cefalu lighthouse

Tunny fishery. — Tunny nets are laid out during the season, March to November, off Capo Caldura, and extend 1$\frac{1}{10}$ miles in a northerly direction. The outer end of the nets are marked, by day, with a floating beacon surmounted by a mast; and at night by a *white* light. *See* also Caution, page 73.

Anchorage. — Vessels wishing to communicate with Cefalu should anchor midway between the town and Punta Santa Lucia, in a depth of 8 fathoms.

Communication.—The line of steamers between Palermo and Brindisi call weekly; there is a station on the railway between Messina and Palermo, and telegraphic communication. The telegraph office is open till 9 p.m.

Supplies of fresh provisions may be obtained, but only a limited quantity of water; an abundant supply of good water may, however, be procured near Caldura.

General charts 1976, 165, 1800, 1440, 2158a, b, 449.

Chart 170, Cefalu to Mazzara. Var. 7° 50′ W.

Coast. — Punta Plaia, about 3½ miles westward of Cefalu, is cliffy; the coast between is bold, indented by several rocky bays, and the dangers do not extend far off, there being depths of from 20 to 30 fathoms at about a mile from the shore. Upon the nearest western point from Cefalu is the town of Santa Lucia.

The Fiumara Grande, one of the largest streams in Sicily, is nearly 7 miles westward of Punta Plaia, and midway is Torre Rocella, which is square and in a good state of preservation; the seaport of Termini Imerese is 5½ miles further on in the same direction. Except to within about 2 miles of the latter, the coast is level, and bordered by a sandy beach clear of danger, a few rocks projecting from the shore eastward of Termini Imerese. Monte Calocero (Calogero), a conspicuous mountain, 4,350 feet above the sea, lies about 2¾ miles south-eastward of Termini Imerese.

Plan of Termini Imerese on 170.

TERMINI IMERESE. — The town of Termini Imerese (ancient Himera), picturesquely situated on the declivity of a hill rising from the sea, is surrounded by an old wall and defended by a castle on a high rock. The streets are in general narrow and dirty, but there are some tolerably good buildings, among which are several churches and convents, a royal college, hospitals, and warm mineral springs, whence it derived its ancient name, &c.; the population is about 20,600.

Breakwater. — A breakwater extends in an easterly direction from the point north of the town, for a distance of 765 yards, and from its head, Secca di San Giovanni, with 9 feet water over it, extends, in a south-easterly direction, for a further distance of 2 cables. The breakwater is being extended over Secca di San Giovanni, and when completed will have an additional length of 600 yards. The space southward of the breakwater has depths of from 2 to 4½ fathoms.

LIGHT (*Lat. 37° 59′ N., Long. 13° 43′ E.*). — About 5 cables outside the root of the breakwater, an iron support, 19 feet in height, surmounting a white shed, exhibits, at an elevation of 28 feet above the sea, a *fixed white* light, whose visibility is not stated.

Light-buoy. — A buoy exhibiting a *flashing green* light *every nine seconds*, thus:—flash, *four seconds;* eclipse, *five seconds*, is moored at a distance of 3$\frac{6}{10}$ cables 112° true from the breakwater lighthouse. Vessels should always pass to the eastward of the light-buoy to avoid the breakwater extension works.

General charts 165, 1440, 2158a, b, 449.

Plan of Termini Imerese on 170. Var. 7° 50′ W.

Mooring buoys. — There are three mooring buoys in the harbour; they lie in an east and west direction, about 1⅓ cables southward of the breakwater.

Communication.—There is a weekly steamer to Marseille and Venice; railway communication with Palermo and Messina, and telegraphic communication with all parts. The telegraph office is open till midnight.

Supplies. — Fresh provisions of good quality are plentiful, and excellent water may be obtained from a fountain near the Harbour master's office at the commencement of the breakwater.

Trade. — The principal exports are cereals, sulphur, olive oil, sumach, wine, and salt fish.

Chart 170, Cefalu to Mazzara.

Coast.—The Fiume Milicia flows into the sea 8 miles to the northwest of Termini Imerese, thence a rocky coast, broken into several small bays, trends 3½ miles to the northward, to the bold head of Capo Zaffarano. Scattered along the coast are some towers, mills, and villages, and the town of Trabia, Altavilla Militia, Casteldaccia, and Bagheria, interspersed by many small streams and watercourses; a range of rocky heights slopes down from Monte S. Onofrio (elevated about 2,600 feet above the sea, and 2½ miles from the shore), for 4 miles towards the outlet of the Fiume San Michele; the country is generally fertile. A conspicuous mark for this part of the coast is Pizzo di Cane, a peak 4,020 feet high, and about 4½ miles inland.

Trabia (*Lat. 38° 0′ N., Long. 13° 40′ E.*), situated on the coast at the foot of a lofty cliff, contains a baronial castle and a fish-curing establishment; Capo Grosso is surmounted by a remarkable castle.

Communication.—There is a railway station at Bagheria and Santa Flavia on the line between Messina and Palermo, telegraphic communication there, and also at Casteldaccia at limited hours.

Supplies of fresh provisions may be obtained at Casteldaccia.

Tunny fisheries.—Tunny nets are laid out during the season, March to November, from the following places on the coast between Termini Imerese and Capo Zaffarano.

At Trabia, 2¼ miles westward of Termini Imerese, extending 2 miles in a N.N.E. direction.

At San Nicola, 4½ miles westward of Termini Imerese, extending one mile in a N.N.E. direction.

From in front of the castle at Solanto, near Capo Grosso, for a distance of 9 cables in an E.N.E. direction.

General charts 165, 1440, 2158a, b, 449.

Chart 170, Cefalu to Mazzara. *Var. 7° 50′ W.*

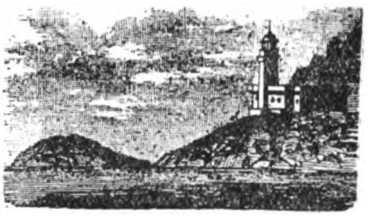
At Capo Sant' Elia, 1¼ miles to the northward of Capo Grosso for a distance of 9 cables in an E.S.E. direction.

The outer ends of these nets are all marked, by day, with a floating beacon surmounted by a mast, and at night by lights; Trabia and San Nicola nets have a *white* light, and Solanto and Sant' Elia have *three coloured* lights. *See* also Caution, page 73.

Plan 169, Palermo bay.

Capo Zaffarano. — A bold but rocky coast, forming two small bays, trends northward 1½ miles, and terminates in Capo Zaffarano; cliffy heights rise to an elevation of above 1,000 feet a short distance within. The cape is a high, isolated, rocky pyramid with a tower, and being separated by low land from the rugged mass of Monte Montalfano, 1,227 feet above the sea, appears at a distance like an island. A little off the head is an islet 20 feet high, and several rocks, with 3 fathoms between, and at half a mile from the shore there are depths of from 35 to 45 fathoms.

LIGHT (*Lat. 38° 7′ N., Long. 13° 32′ E.*). — A white octagonal tower, 36 feet in height, with a dwelling adjoining, and situated on Capo Zaffarano, exhibits, at an elevation of 111 feet above the sea, a *fixed red* light, which in clear weather is visible from a distance of 10 miles. For arc of visibility, *see* Light list.



Capo Zaffarano lighthouse.

Scoglio di Formica, situated 143° true, distant 1¾ miles from Capo Zaffarano lighthouse, are two ledges, one awash and one one foot above water, but which is sometimes covered, about a quarter of a mile in length in an easterly and westerly direction, and steep-to; there are from 7 to 12 fathoms water around; 45 fathoms about half a mile north and east of them, and from 7 to 27 fathoms between them and the coast. Secca di Chianca, with 7 fathoms water over it, is about three-quarters of a mile northward of Scoglio di Formica.

Beacon.—A beacon, consisting of an iron staff, surmounted by a flag with "Formica" lettered on it, stands on Scoglio di Formica.

Anchorage.—Southward of Capo Grosso is Porto d'Espagna (di Spagna), where vessels unable to reach Palermo, during westerly gales, will find good anchorage in 12 and 15 fathoms water, about a mile from the beach.

General charts 170, 165, 1440, 2158a, b, 449.

Plan 169, Palermo bay. Var. 7° 50′ W.

Capo Mongerbino. — From Capo Zaffarano a bold coast, bordered by steep cliffs, trends in a north-west direction for about 1½ miles to Capo Mongerbino, which is a projection from Monte di Aspra, 1,171 feet above the sea, and about half a mile to the southward; the cape is surmounted by a tower, and a rock, 10 feet high, lies half a cable off it.

BAY OF PALERMO. — Between Capo Mongerbino and Capo Gallo, which latter bears about 312° true, distant 11 miles from the former, the coast recedes about 4 miles, and forms the Bay of Palermo, having a bold shore, and a depth of 30 fathoms at about a mile distant. Between the hills, whose summits are from 1,970 to 2,549 feet above the sea, and the steep falls of which are from a mile to 1½ miles from the shore, are villages, scattered farms, and well-cultivated land. The Fiume Oreto, on the south side of Palermo, is crossed by a bridge with two arches near the mouth.

About 2 miles northward of Palermo is Monte Pellegrino, rugged, and elevated 1,988 feet above the sea, and remarkable from its isolated position; upon it are a disused signal tower and the large statue of Santa Rosalia. Between the craggy mass which forms Capo Gallo and this mountain is the valley of Conca d'Oro, which terminates in a sandy beach three-quarters of a mile in extent, named Baja di Mondello.

Plan of Port of Palermo on 169.

Porto di Palermo (*Lat. 38° 8′ N., Long. 13° 22′ E.*).—To the northward of the city, and 6½ miles westward of Capo Mongerbino, is the arsenal, from which the northern mole extends in a southerly direction a distance of 700 yards, and in a south-easterly direction 160 yards, into 10 fathoms of water, protecting from the eastward an area sufficiently large for commercial purposes.

The southern mole extends from the south-east side of Porto Felice, in a north-easterly direction, a distance of 160 yards, and thence in a northerly direction, a distance of 450 yards, leaving an entrance between it and the north mole about 2 cables in width.

The space thus enclosed is much obstructed by shoal flats, over which the depths are from one fathom to 3 fathoms, which extend from one cable to 2½ cables from the shore. Vessels moor with an anchor to the westward and the stern secured to the mole. The Custom-house and a health office are situated at the north-east corner of the port.

A mole extends eastward from Santa Lucia, on the western side of the northern part of the port, for a distance of 400 yards, and at 70 yards northward of Santa Lucia, another mole, parallel with it, forming the railway jetty, extends the same distance.

General charts 170, 165, 1440, 2158a, b, 449.

Plan of Port of Palermo on 169. Var. 7° 50′ W.

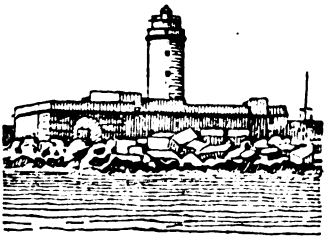
Porto Felice, a cove a quarter of a mile deep and a cable wide, is situated on the south-east side of the citadel, at the south-east angle of the city. On its south-east side is a health office and landing place, and on the north-west a watering place.

Depths.—There is a depth of 8 to 10 fathoms in the entrance to the port, from 3¼ to 8 fathoms in the northern part of the port, from 3½ to 6½ fathoms in the southern part, and 3½ to 4 fathoms in Porto Felice. A 30-foot channel has been dredged to the dry dock.

Vessels can go alongside in the north basin, where the depth is 23 feet; also alongside the north pier, in depths of from 23 to 30 feet.

The railway company's goods jetty has a depth of 23 feet, and the quays at the northern portion of the basin have a similar depth alongside.

LIGHTS (*Lat. 38° 8′ N., Long. 13° 22′ E.*).—At 360 yards from the extremity of the north mole, a white circular tower, 65 feet in height, and surmounting a fort, exhibits, at an elevation of 95 feet above the sea, a *fixed* and *flashing white* light *every two minutes*, thus:—fixed, *fifty-seven seconds;* partial eclipse, *twenty-eight seconds;* flash, *seven seconds;* partial eclipse, *twenty-eight seconds;* it is visible in clear weather from a distance of 16 miles. For arc of visibility, *see* Light list.



North mole lighthouse.

Near the extremity of the north mole an iron staff, surmounting a white pillar and shed, the whole 23 feet in height, exhibits, at an elevation of 31 feet above the sea, an *occulting green* light *every five seconds*, thus:—light, *three seconds;* eclipse, *two seconds;* it is visible in clear weather from a distance of 10 miles.

An *occulting red* light *every five seconds*, thus, light *three seconds*, eclipse *two seconds*, is shown, at an elevation of 30 feet above the sea, from a masonry structure, 21 feet in height, and situated near the extreme of the south mole; in clear weather it is visible from a distance of 10 miles.

From the outer extreme of Santa Lucia mole are exhibited *two fixed* lights, vertical, 6 feet apart, the upper *red*, and the lower *green*.

Buoys.—The bank off Forte di Castellamare, on the south-west side of harbour, is marked by the following buoys:—

A black and white spar buoy, one cable 260° true from the lighthouse on the south mole.

A white conical buoy, 1⅛ cables 223° true from the same lighthouse.

General charts 170, 165, 1440, 2158a, b, 449.

Plan of Port of Palermo on 169. Var. 7° 50′ W.

A black and white spar buoy, $1\frac{8}{10}$ cables, 202° true, from the same lighthouse.

A white conical buoy, $3\frac{2}{10}$ cables, 205° true, from the same lighthouse.

A black and white spar buoy is moored on the edge of the shoal water southward of Santa Lucia; it lies $2\frac{1}{2}$ cables 242° true from the lighthouse at the extremity of the north mole.

There are also four mooring buoys, a white one inside the entrance to the port, marked No. 1; one inside the railway pier, for the use of port boats; and two in the northern part of the port.

Beacon.—The outer edge of the shoal southward of Santa Lucia mole is marked by a red wooden beacon, situated 255° true, distant $2\frac{1}{4}$ cables from the lighthouse on the extremity of the north mole.

Pilots.—Pilots may be obtained; their boats are distinguished by the letter P on their sails.

The rates of pilotage are as follows—

Tons net registered	1	to	100	.....	30	lire.
„ „	101	„	200	.....	39	„
„ „	201	„	300	.....	48	„
„ „	301	„	400	.....	57	„
„ „	401	„	500	.....	66	„
„ „	501	„	750	.....	78	„
„ „	751	„	1,000	.....	90	„
„ „	1,001	„	1,500	.....	105	„
„ „	1,501	„	2,000	.....	120	„
„ „	2,001	and over		.....	130	„

Every vessel piloted from the offing up to the mooring point in the interior of the port will pay the entire rate.

Every vessel piloted to the roads will pay one-half of the pilotage.

If she wishes to be taken from the roads to the port she will pay the other half.

Anchorages (*Lat. 38° 8′ N., Long. 13° 23′ E.*).—A good anchorage outside the port is with the lighthouse on the south mole-head bearing about 270° true, distant $1\frac{1}{2}$ cables, in $16\frac{1}{2}$ fathoms water over a bottom of stiff mud, or further out with the north mole lighthouse bearing 315° true, about a quarter of a mile distant, in 19 or 20 fathoms over a similar bottom.

Sailing vessels approaching the anchorage should be prepared for squalls in passing Baja di Mondello with fresh westerly winds.

Though a heavy sea sets in with winds from seaward in winter, the anchorage does not appear to be dangerous, provided precautionary measures are adopted.

Vessels anchoring inside the port, should be careful to have the

Plan of Port of Palermo on 169. Var. 7° 50′ W.

anchors buoyed, as several cases of injury to ships' bottoms have occurred through the projecting flukes of anchors.

With off-shore winds anchorage may also be found in the eastern part of the Bay of Palermo in 9 or 10 fathoms water, between Torre Corsaro and Aspra village.

City (*Lat. 38° 7′ N., Long. 13° 22′ E.*).—Palermo (ancient Panormus), the largest city in Sicily, and the capital of a province, stands in a plain which, from its luxuriance, and from being surrounded by mountains on three sides, has been termed the "conca d'oro," or the golden shell. It was originally founded by the Phœnicians, passed into the possession of the Carthaginians, and from them to the Romans 254 years B.C. It was afterwards taken by the Saracens, and again by the Normans in 1072.

In front of the city, the numerous steeples, cupolas, and towers of which give it a noble appearance from the sea, is La Marina, extending nearly a mile along the bay. At the south end of the walk, La Flora, a public garden with walks, is interspersed with statues, fountains, and summer houses. Palermo is regularly built; two fine streets, each upwards of a mile in length, intersect each other at right angles, dividing the city into four equal parts, each leading to one of the four principal gates.

These streets are well paved with large flat blocks of lava, and are faced throughout their whole length with handsome buildings; there are numerous squares, public edifices, convents, and churches. The cathedral, erected about the year 1180, is externally of gothic architecture. The royal palace is a spacious building of mixed Arabic and Norman architecture; on its summit is the observatory erected in 1748.

The tribunal of justice and the Custom-house occupy a large edifice on La Marina, formerly the palace of the inquisition, abolished in 1782. The prison, the Jesuits' college (a magnificent building), the university, the archbishop's palace, with several ill-constructed theatres, are among the remaining remarkable buildings. The city is surrounded by an old wall, and defended by a citadel and several other forts, and is lit by electricity. The population in the year 1911 was 341,656. A British Consul resides at Palermo.

Communication. — Steamers daily to Naples; twice every week to Ustica; weekly to Marseille, Malta, Fiume, Trieste, Trapani, Tunis, Messina, Venice, Brindisi, Cagliari, Port Empodocle, and to Catania and Syracuse; fortnightly to England, Salonica, Constantinople, Genoa, Smyrna, and Odessa; monthly with New York; there are also periodical steamers to Bristol, Amsterdam, Hamburg, and New Orleans.

General charts 170, 165, 1440, 2158a, b, 449.

Plan of Port of Palermo on 169. Var. 7° 50′ W.

Railway communication with Messina, Catania, and Trapani; telegraphic communication with all lines, and electric tramways in the streets, and telephone throughout the city. On payment of a small sum the telephone company will put a telephone on board any vessel in the port. The central telegraph office is always open. There is a wireless telegraph station at Sferracavallo, westward of Capo Gallo, open to the public from sunrise to sunset; call letter M.P.P.

Coal and supplies. — About 18,000 tons of coal are kept in stock amongst a number of firms; from 600 to 800 tons could be put on board in 24 hours, but none on Sundays; there are over 200 lighters, 39 of which are of about 30 tons.

No winds prevent coaling in the port, but strong N.E., South, and S.E. winds prevent coaling outside.

Supplies of fresh meat, bread, and vegetables are plentiful, and very good, but a few days' notice of requirement should be given; water is supplied from a contractor's water tank in the city; it is brought from Scillato in the Madorne mountains, a distance of 44 miles; this water, from analysis in London, is reported as irreproachable in quality.

Dock and patent slip. — There is a dry dock in the north-eastern corner of the port, and a patent slip in Porto Felice. For particulars, *see* Appendix I.

Repairs.—Large repairs to machinery can be executed; there is a 20-ton crane on North mole, a 3-ton crane on Santa Lucia mole, a 40-ton steam crane near the docks, two 2-ton and two 5-ton cranes on the railway pier, and several smaller ones; there is an 8-ton steam hammer. Two divers may be obtained.

Chronometers can be rated at the Observatory.

Hospital.—There is a hospital which receives strangers at a fixed charge.

Trade. — The principal exports are wines, oranges and lemons, sumach, sulphur, grain, olive oil, almonds, and nuts; and imports, petroleum, wine and spirits, tobacco, herbs, timber, coal, and grain. In 1910 the total value of imports was £1,495,291, and exports £2,033,389. In 1911 the amount of coal imported was 220,930 tons.

Shipping. — In 1911, 2,205 steam vessels, with a total tonnage of 3,031,569 tons, entered the port, and 1,395 sailing vessels, with a total tonnage of 96,836 tons.

General charts 170, 165, 1440, 2158a, b, 449.

Plan of Port of Palermo on 169. Var. 7° 50′ W.

Tugs.—Four tugs are available in fine weather.

Winds and weather.—*See* Meteorological table, Appendix III.

Plan 169, Palermo bay.

Capo Gallo, the north-west extreme of the Bay of Palermo, is the north-eastern termination of the mountain of the same name, which rises immediately over it to an elevation of 1,886 feet above the sea, distinguished by dark red patches, and at a distance appearing like an island.

About a mile south-eastward of Capo Gallo is Punta Mondello, low, projecting and surmounted by a tower; upon the south side of it is a battery, and others are erected on points one and 2 miles farther in; thence the coast trends to the southward, about 3½ miles, to Porto di Palermo.

LIGHT (*Lat. 38° 13′ N., Long. 13° 19′ E.*).—On Capo Gallo, a white circular tower, 25 feet in height, and with a white detached dwelling, exhibits a *fixed white* light, at an elevation of 133 feet above the sea, which is visible in clear weather from a distance of 12 miles. For arc of visibility, *see* Light list.

Capo Gallo lighthouse.

Signal station.—Semaphore.—Vessels can communicate with a semaphore, situated about a third of a mile south-west of the lighthouse at an elevation of 1,886 feet above the sea.

Chart 170.

Secca la Barra, a bank about a mile long east and west, and having a least depth of 43 fathoms over it, lies 4½ miles north-eastward of Capo Gallo, and is just inside the 100 fathoms extending from the coast.

Plan 169, Palermo bay.

Tunny fishery.—Tunny nets are laid out during the season, March to November, at Vergine Maria, about 2 miles northward of Palermo, for a distance of one mile from the coast in a north-easterly direction. The outer end of the nets is marked, by day, with a floating beacon, surmounted by a mast; and by night with a *white* light. *See* also Caution, page 73.

Anchorage.—In Baja di Mondello, off the sandy beach, there is anchorage with westerly winds in from 10 to 12 fathoms water, but heavy squalls at times blow down the valleys.

Rock.—A pinnacle rock, with a depth of 6 feet over it, lies with Torre Mondello bearing 359° true, distant 3¾ cables.

Submarine telegraph cable.—Palermo is connected with Naples, viâ the island of Ustica, by a telegraph cable. The cable-

Plan 169, Palermo bay. Var. 8° W.

house (with the inscription "Cavo sottamarino") is situated in Baja di Mondello, about 54 yards from the sea. Two white frame balls indicate the direction (48° true) of the first portion of the cable.

On the seaward side of the cable-house a notice prohibiting anchorage is affixed.

Coast. — From Capo Gallo an indented rocky coast trends in a westerly direction for 3¾ miles to a low projection, and at 2 miles is a small bay named Sferracavallo, which has a small extent of sandy beach, and is frequented as a bathing place.

Wireless telegraph station.—There is a wireless telegraph station in Sferracavallo bay, open to the public from sunrise to sunset. The call letters are M.P.P.

Communication. — Sferracavallo has telephonic communication with Palermo.

Supplies.—Small supplies of fresh provisions and water may be obtained.

Chart 170, Cefalu to Mazzara.

Isola delle Femmine (*Lat. 38° 12′ N., Long. 13° 15′ E.*), about a quarter of a mile off the low eastern point of the bay, is low and rocky, with a square tower on its summit. The islet is steep-to on the north side, but between it and the shore there is only a boat passage.

Baja di Carini, between Isola delle Femmine and Torre Orsa, is an indentation of the coast 1½ miles deep, along the eastern portion of which is a sandy beach; the remainder is a rocky broken shore, and on several of the points to the westward are signal stations. The bay is surrounded by high land at about 3 miles from the beach, Monte Castellaccio, over the village of Capaci on the east, attaining an elevation of 3,145 feet, and Montaniello (over Carini upon the west), 3,160 feet above the sea.

The small town of Capaci is at the foot of the steep slopes, three-quarters of a mile from the shore, and the town of Carini (ancient Hycara), 2½ miles inland from the western side of the bay; it has a gothic castle, several churches, convents, &c., and about 12,000 inhabitants. Beyond the mouth of Fiume della Grazia, where the rocky coast takes a northerly trend for about a mile, is Torre Muzza.

Communication.—There is a telegraph station at Capaci, and a railway station at Carini on the line between Palermo and Trapani.

Anchorage may be taken up in the bay with the town of Capaci bearing 133° true, in from 8 to 10 fathoms water, or south-eastward of Torre Muzza in 4½ fathoms about 2 cables from the shore.

General charts 165, 1440, 2158a, b, 449.

Chart 170, Cefalu to Mazzara. Var. 8° W.

Tunny fishery. — Tunny nets are laid out during the season, March to November, about one mile eastward of Punta Raisi; they extend for 2 miles in a northerly direction from Torre Orsa. The outer end of the nets is marked, by day, with a floating beacon, surmounted by a mast; and at night with a *white* light. *See* also Caution, page 73.

GOLFO DI CASTELLAMARE (*Lat. 38° 6′ N., Long. 12° 55′ E.*). — Punta Raisi is the northern extreme of a low rocky and foul shore fronting the high land before mentioned, together with that of Monte Palmito to the south-westward, 1,700 feet above the sea. Between Punta Raisi and Capo San Vito, the coast forms Golfo di Castellamare, an indentation about 10 miles deep, named after the town at the head.

Depths off-shore. — Except off the rocky points at both extremes, the bay is generally clear of danger, deepening gradually to 100 fathoms at 4 miles distant, which depth will be found at less than a mile along the western shore; the eastern, however, is less precipitous; the bottom is generally of mud; in the centre of the bay the depths are about 350 fathoms, over mud.

Coast. — On the east side of the bay from Capo Rama, which is bold, clear of danger, and surmounted by a tower, the coast is composed of cliffs from 80 to 100 feet above the level of the sea, and trends in a southerly direction for a distance of 3¼ miles, to the mouth of Fiume Poddastci; the rocks are perforated with some caverns or grottoes, and on the slope of the mountains are a few houses and castellated buildings; on the banks of the river are several mills. The large town of Partinico lies at the foot of Monte Cesaro, 1,485 feet above the sea, and about 4 miles from the coast. The town has an export trade in wine and oil, and manufactures of woollen and silk fabrics.

Communication. — There is a railway station on the line between Palermo and Trapani at Partinico, also telegraphic communication.

Coast. — From Fiume Poddastci a sandy beach stretches for 9½ miles in a west-south-west direction to Castellamare, and at 2½ and 4 miles respectively are the villages of Trappeto and Balestrate; the railway skirts the beach from Trappeto to Castellamare.

Castellamare del Golfo, a seaport situated in the south-western corner of the bay, affords but little accommodation except for small coasters and fishing boats; it stands in a cove rather more than a cable wide, at the head of which, small vessels haul up on a beach. The town is small and dirty, and on a rocky tongue of land which forms the eastern side of the cove, is a dilapidated castle. The exports

Chart 170, Cefalu to Mazzara. Var. 8° W.

are wine, cotton, fruit, manna, and shumac, and the population about 15,300.

Steep, cliffy ridges rise immediately over the town and extend some distance southward; Monte Inice, elevated 3,546 feet above the sea, lies 2 miles to the southward, and about 6 miles from the town, in the same direction, is the ruin of a beautiful temple, and other vestiges of Segesta (ancient Segestoe), near which is the town of Calatafimi.

LIGHT (*Lat. 38° 2′ N., Long. 12° 53′ E.*). — An *occulting white* light *every fifteen seconds*, thus:—light, *ten seconds;* eclipse, *five seconds*, is exhibited, at an elevation of 50 feet above the sea, from a small masonry tower, 46 feet in height, on the western side of the entrance to the port; it is visible in clear weather from a distance of 9 miles.

Shoal. — A shoal, with 11 feet water over it, lies 343° true, distant 4⅓ cables from the castle.

Mooring buoy.—A red mooring buoy, with "Boa di Castellamare" upon it, is moored in the roadstead off Castellamare, in a depth of 39 feet.

Communication.—Railway communication with Palermo and Trapani, the railway station being at San Bartolomeo, about 2½ miles to the eastward.

Supplies of fresh provisions and water are scarce.

Tunny fisheries.—Tunny nets are laid out during the season, March to November, near Castellamare at the following places.

About 2¼ miles eastward of the town, for a distance of about 1½ miles in a northerly direction.

Southward of Porto point, in a north-north-east direction for a distance of one mile.

The outer ends of the nets are marked, by day, with a floating beacon surmounted by a mast; and at night with a *white* light. *See* also Caution, page 73.

Coast. — A rocky coast, bordered by steep cliffs, trends in a northerly direction for 1½ miles from Castellamare to two salient points, the southern named Porto point (Punta la Porto); on the west side of the other is a bay, open to the north-east. The general direction of the coast (which is broken and rocky) is about north-west for 2½ miles, to Torre Scopello. About 2½ miles westward of the tower is Monte Sparagio (3,637 feet), the range, of which it is the southern termination, extending across to Monte Cofano on the western coast of Sicily, and also to the northward towards Capo San Vito.

Shoal.—To the southward of Torre Scopello are several rocks; a shoal, with 3½ fathoms water on its extreme edge, extends about 3 cables from the point under Torre Scopello; there are 20 fathoms

Chart 170, Cefalu to Mazzara. Var. 8° W.

just outside it, and with north-east winds, the sea breaks heavily on this shoal.

Punta Solanto, named also Monaca, 7 miles to the north-north-west of Torre Scopello, has a fringing shoal which extends seaward 1½ cables. All along this part of the coast the water is deep, 100 fathoms being obtained in some places, within a quarter of a mile of the rocks.

Tunny fisheries.—Tunny nets are laid out during the season, March to November, at the following places on the coast between Porto point and Punta Solanto.

From near Torre Scopello, for a distance of about 8¼ cables in a north-easterly direction.

At about a mile southward of Punta Solanto in an east-south-easterly direction for a distance of about 3 cables.

The outer ends of the nets are marked, by day, with a floating beacon, surmounted by a mast; and at night with a *white* light. *See* also Caution, page 73.

Baia di San Vito. — Capo San Vito lies about 1½ miles westward of Punta Solanto, and has a lighthouse on its extreme. The point on which the lighthouse stands forms the west side of a small bay, at the head of which is the little village of San Vito.

Anchorage (*Lat. 38° 11′ N., Long. 12° 45′ E.*). — There is good anchorage in the bay with westerly winds, in 6 or 7 fathoms water, over mud, with the lighthouse bearing 330° true, and Torre del Roccazzo, a town on the shoulder of the first rise of land inside Capo San Vito, in line with a small tower near the beach, north of the village, about 240° true. The south shore of the bay is shallow.

Tunny fishery. — Tunny nets are laid out during the season, March to November, in Baia di San Vito; the nets extend in a north-easterly direction for 1¼ miles from the head of the bay. The outer end is marked by a floating beacon surmounted by a mast by day and a *white* light at night. *See* also Caution, page 73.

Communication. — There is a good carraige road to Trapani and telegraphic communication at limited hours.

Supplies. — Fresh beef in a limited quantity may be obtained, but sheep and goats are plentiful; water is not good.

The description of this coast from Capo San Vito westward is given at page 524.

General charts 165, 1440, 2158a, b, 449.

CHAPTER IX.

THE ISLAND OF SARDINIA.

(Lat. 41° 23′ N. to Lat. 38° 46′ N.)
(Long. 10° E. to Long. 8° E.)

VARIATION IN 1912.—Decreasing about 7′ annually.

Chart 1189, Bonifacio strait. Var. 10° W.

NORTH COAST.—Capo Testa (the ancient Erebantium prom.) forms with Capo Feno (Corsica), which bears 347° true, distant 9 miles from it, the western entrance to Bonifacio strait. Capo Testa, a small peninsula nearly circular, is united to the coast by a neck of sand, and rugged; its western face is formed of bare granite cliffs, fringed with rocks which extend seaward a quarter of a mile. A signal tower, named Torre Santa Reparata, stands on its summit, at an elevation of 417 feet above the sea. *See* view, page 639.

LIGHT (*Lat. 41° 15′ N., Long. 9° 9′ E.*).—Near the north extreme of Capo Testa a white square tower, 76 feet in height, and surmounting a white dwelling, exhibits, at an elevation of 220 feet above the sea, an *alternating fixed* and *flashing white* and *red* light *every three minutes*, thus:—*white* fixed, *one hundred and four seconds;* partial eclipse, *thirty-one and a half seconds; red* flash, *thirteen seconds;* partial eclipse, *thirty-one and a half seconds;* it is visible in clear weather from a distance of 20 miles. For arc of visibility, *see* Light list.

Capo Testa lighthouse.

Lloyd's signal station.—Semaphore.—Near the lighthouse is a Lloyd's signal station, and a black and white semaphore, at an elevation of 137 feet above the sea, with which vessels can communicate.

Outlying dangers.—North Testa rock, about 20 yards in diameter, and with a depth of $3\frac{1}{4}$ fathoms, lies 264° true, distant $1\frac{1}{10}$ miles, from Capo Testa lighthouse.

South Testa rock, 30 yards in diameter, with a least depth of 4 fathoms, lies 236° true, distant $1\frac{6}{10}$ miles from Capo Testa lighthouse.

General charts 1131, 1780, 161b, 676, 2158a, 449.

Chart 1189, Bonifacio strait. Var. 10° W.

There is deep water between these rocks and the shore.

Foul rocky ground extends 4 cables westward of the cape.

Two shoals of small extent, with the least depths of 4¼ and 4 fathoms, lie respectively 220° true, distant three-quarters of a mile, and 211° true, 9 cables from Torre Santa Reparata, and there are other shoals between these and the shore.

Baia di Santa Reparata.—On the north side of the promontory of Capo Testa is Cala Spinosa, a small cove, and further eastward Baia di Santa Reparata, formed by the neck of sand uniting the promontory to the coast, is nearly circular, 4 cables deep, with 11 fathoms water at the entrance, which depth diminishes gradually to the beach. Small vessels here find shelter from nearly all winds, being only exposed to the north-westerly swell when the wind is from that quarter. A chapel stands near the beach in the west corner of the bay. Near Cala Spinosa the columns for the Pantheon of Rome were said to have been quarried, and many shafts and other parts of such-like structures were, not very long since, lying near the chapel on the beach.

Water may be procured from a grotto near the sea.

Isolotto Monica, about a mile north-eastward of Baia di Santa Reparata and lying close to the coast, is 2 cables in length, in a north and south direction, surrounded by rocks and shallow water, and from it the rocks extend nearly 2 cables to the north-eastward and north-westward.

Porto Longosardo (*Lat. 41° 15′ N., Long. 9° 12′ E.*), entered half a mile south-eastward of Isolotto Monica, extends three-quarters of a mile in a south-south-westerly direction, and is about a third of a mile wide at the entrance, but narrows to a cable across, at nearly half-way in, where, abreast Santa Teresa Gallura village, there is only a depth of 5 feet, over a bottom of mud and weed; outside this are depths of 3 to 10 fathoms.

The port is used by small vessels, which find fair shelter, and no great inconvenience from northerly winds. A circular tower, 130 feet above the sea, at the south-west end of a triangular wall, stands on the west point of entrance near the western shore of the port, south-west of the tower, is the village above mentioned, and on a height on the opposite side of the inlet is a castle in ruins.

Shoals.—At a third of a mile from the shore, and 16° true from the above tower, is a rocky shoal with 11 feet water over it, and, nearly midway between it and the shore, another shoal on which the depth is 3 fathoms.

General charts 1131, 1780, 161b, 676, 2158a, 449.

Chart 1189, Bonifacio strait. Var. 10° W.

A shoal with a depth of 11 feet over it lies 40° true, distant 8 cables from the town.

Buoys.—Both the 11-foot shoals are marked by buoys. The one on the starboard hand, entering, is coloured black, the one on the port hand red.

Communication.—Steamers between Porto Torres and Genoa call here, and there is telegraphic communication at limited hours.

Supplies.—Fresh provisions in small quantities may be obtained.

Landing.—A small landing mole is situated at the head of the port.

Punta Falcone, 1¾ miles eastward of the tower on the west side of the entrance to Porto Longosardo, and the north extreme of Sardinia, is moderately high and rugged, and between it and Punta Marmorata, half a mile further eastward, rocks and shoals extend for nearly a quarter of a mile in a north-easterly direction. The coast between Porto Longosardo and Punta Falcone is foul, especially on the western side of the entrance to Porto Quadro, where a group of rocks extend a cable from the shore.

The strait, between Punta Falcone and Secca Lavezzi, from the 5-fathom line is 3 miles wide, with depths of from 35 to 38 fathoms in the centre.*

Signal station.—Semaphore.—On Punta Falcone is a black and white semaphore, with which vessels can communicate.

Plan 2157, Maddalena and adjacent islands.

Submarine vessels.—Caution.—*See* page 658.

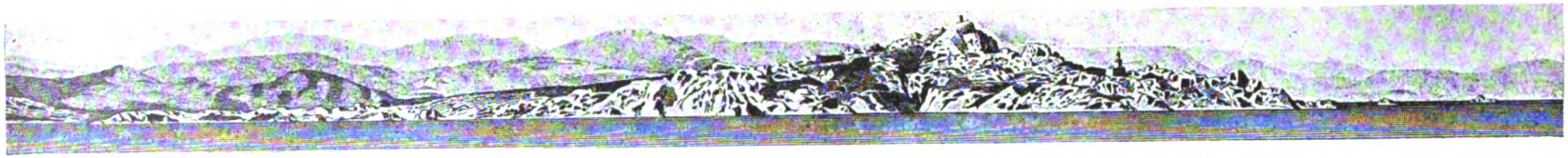
Contra di li Scale.—Beacon.—On Contra di li Scale, a hill 367 feet high, about 6 cables southward of Punta Falcone, is a white masonry beacon. A line through this beacon and a similar one on Punta Marmorata marks the western territorial limit of the Sardinian tunny fisheries.

Isole Marmorata.—Half a mile east-south-eastward of Punta Falcone is Punta Marmorata, with a white masonry beacon on its extreme, and close beyond it and near the coast are two islets of the same name, lying in a north-east and south-west direction; rocks and shallow water extend 3 cables to the north-east of the islets, also about 1½ cables eastward.

Punta Monterosso (*Lat. 41° 14′ N., Long. 9° 16′ E.*), 2 miles south-eastward of Punta Marmorata, is rugged and surrounded by rocks, which extend half a mile to the north-east; the outer of these

* *See* also Mediterranean Pilot, Vol. II., Chapter IV.

General charts 1131, 1780, 161b, 676, 2158a, 449.

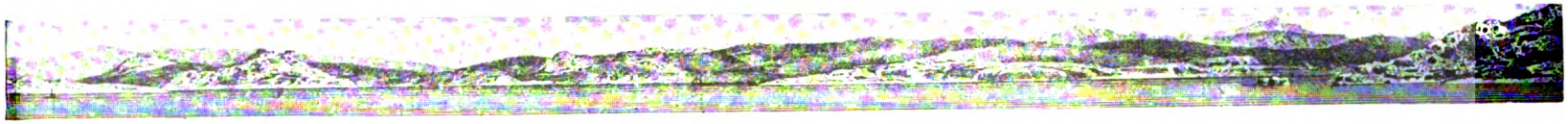


Lighthouse bearing 199° true, distant 2 miles.

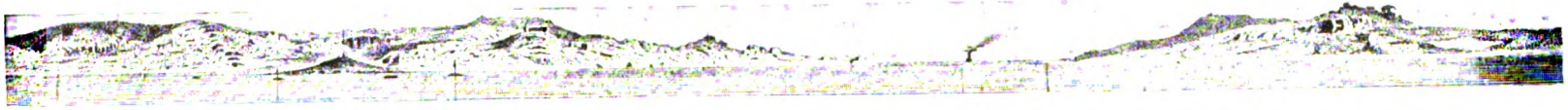
Capo Testa.

Isola Spargiotto. *Isola Spargi.* *Isola di San Stefano.* *Punta Sardegna.* *Paganetto beacon, bearing 215° true, distant 1 3/10 miles.* *Monte Cane.* *Isola delle Vacche.*

Clearing mark for Scoglio Paganetto, Secca Colombo and Secca Corsara.



Mezzo Passo beacon, bearing 133° true, distant one mile. *Secca del Parau beacon.* *Punta Sardegna.*



Secca del Parau. *Forte San Giorgio, bearing 102° true, distant 1¼ miles.* *Capo d'Orso.*

Plan 2157, Maddalena and adjacent islands. Var. 9° 50′ W.

rocks, named Paganetto, is awash. Scogli Colombo lie near the coast, about half a mile to the south-east of the point.

Beacon. — Scoglio Paganetto is marked by a white iron pole beacon and surmounted by a flag, but no dependence should be placed on it.

Secca Colombo, having a depth of 23 feet, is of small extent, and situated south-eastward distant 4½ cables from Scoglio Paganetto.

Clearing mark. — The south-west point of Isola di Santo Stefano in line with Punta Sardegna, bearing 123° true, leads to the northward of Scoglio Paganetto and Secca Colombo. *See* view facing page.

Porto Pozzo, a narrow vein of water, with depths of from 3½ to 8 fathoms, extends for a distance of nearly 1½ miles, between the main island and the west side of Isole delle Vacche. The entrance is about a cable in width in the deep-water channel, from which the inlet slightly enlarges in width, and at the distance of 1¼ miles it is about 1½ cables wide, with a depth of 3¾ fathoms over mud and weeds. At the head of the inlet there is a basin, somewhat circular, with from 5 to 8 fathoms water over mud.

Although the mouth of the inlet is open to the northward, it is not much affected by the sea, being protected by the islands and south coast of Corsica.

Anchorage. — The anchorage is on the island side, a mile within the entrance, in 6 fathoms water, over a bottom of mud and weeds; to the southward the shore is a sandy beach, and here several small streams flow into the sea.

Isole delle Vacche, which bounds the eastern side of Porto Pozzo, is 1⅔ miles in length in a north and south direction, 308 feet above the sea, and united to the main island by a small neck of sand. A shoal, with 3¾ fathoms water over it, extends about 3 cables north of the island, and its eastern coast is bordered by shallow water extending for a distance of about 2 cables.

Beacon (*Lat. 41° 12′ N., Long. 9° 18′ E.*).—Secca Macchiamala, nearly a mile south-south-east of the north point of the island, and extending about 2 cables from the shore, is marked by a white iron pole beacon, surmounted by a red flag.

Porto Liscia, a nearly semicircular bay, is formed between the south-east side of Isole delle Vacche, and Isole Cavalli, which is nearly half a mile in length in a north and south direction, 52 feet above the sea, and also joined to the shore by a small sandy neck. The bay, three-quarters of a mile wide at its entrance, is open to the north, but there is some shelter in the western corner under

Plan 2157, Maddalena and adjacent islands. Var. 9° 50′ W.

Isole delle Vacche, in about 11 fathoms water, over weeds. Fiume Liscia, having its source in the mountains beyond Tempio Pansania, flows into the bay, after winding down the hills, and out through a marshy plain.

A weedy shoal, with 5 fathoms water over it, lies at the entrance to Porto Liscia, and south-eastward, distant 3 cables from the east point of Isole delle Vacche, and a bank, about 100 yards in extent, with a least depth of 3¼ fathoms, lies within the port, and bears 199° true, distant 4½ cables from the same point.

Porto Pollo, on the east side of Isole Cavalli, is a bay about a mile deep and 4 cables wide at the entrance, with irregular shores; the shore at the head of the bay is a continuation of the low sandy beach of Porto Liscia. An islet, 46 feet above the sea, lies in the inner part, but the passage north and east of it is only suitable for boats.

Anchorage (*Lat. 41° 11′ N., Long. 9° 20′ E.*).—Large vessels may anchor, in case of necessity in the entrance, in 9 fathoms water, over weeds partially sheltered from northerly winds by the islands in the vicinity. To the southward of the islet there is excellent anchorage for small vessels, in a depth of about 8 fathoms; a shoal, with 2 fathoms water over it, lies a quarter of a mile north-westward of the island.

Coast.—From Punta Diego on the east side of the entrance to Porto Pollo, and off which a shoal extends 1½ cables in a north-west direction, the coast, for a distance of 1¼ miles, in an easterly direction to Punta Sardegna, is clear of danger. Cala di Trana, half a mile westward of Punta Sardegna, is open to the north, has from 5 to 8 fathoms water, a sandy beach, and is used by coasting vessels. Punta Sardegna forms, with Isole Maddalena, a channel three-quarters of a mile wide, which will be described with the adjacent islands. *See* Caution, page 647.

Light.—A lighthouse is being constructed on Punta Sardegna.

Water.—There is a spring of good water in Cala di Trana.

Submarine telegraph cable.—A telegraph cable connects Isola Maddalena with the main island in the neighbourhood of Punta Sardegna.

Rada di Mezzo Schifo (Agincourt road).—From Punta Sardegna the coast is clear and bold, and trends southward 1½ miles nearly to a bay named Mezzo Schifo, with a sandy beach at its head; the bay is said to be safe and commodious for all classes of vessels, and though open to the northward no great sea sets in, and the holding ground is good.

General charts 1189, 1780, 1611b, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 50′ W.

Anchorage.—The anchorage, in 11 fathoms water, over weed, is south-eastward of Punta Stropello, about a quarter of a mile from the shore, with Punta Sardegna bearing 331° true, and Capo Ferro lighthouse in line with the south point of Santo Stefano, bearing 110° true; in the northern part of the road the holding ground is bad.

Secca di Mezzo Passo (*Lat. 41° 12′ N., Long. 9° 23′ E.*), a group of three black rocks 2 feet above the sea, lies half a mile to the south-west of Forte Tegge, Isole Maddalena.

Beacon.—A white pyramidal stone beacon marks the rocks. *See* view, page 639.

Secca del Parau or Paura, a group of four rocks about 3 feet above the sea (with a rock awash on their west side), lying about 4 cables south-south-east of Mezzo Passo, are on the eastern side of the main channel; the water is deep a cable from them.

Beacons and buoy.—The west and south extremes of the rocks are marked by white stone pyramidal beacons; the north-east extreme by a white cask buoy.

Prohibited anchorage.—Between a line joining Punta Sardegna and Punta Nido d'Aquila on Isole Maddalena in an east-north-east direction, and a line from Punta Stropello, 104° true to the south beacon of Secca del Parau, from which it is extended north-eastward to Punta Nera on Isole Maddalena, is an area over which anchorage is prohibited.

Parau is the name of a bay three-quarters of a mile south-eastward of Mezzo Schifo. On the west side of the bay is the village of Parau, where a small quantity of fresh provisions and a plentiful supply of water may be obtained; there is also a small pier about 100 feet in length.

Secca Due Piagge.—Beacon.—A shoal, with 13 feet of water over it, lies 2 cables westward of Punta Nera, the eastern point of the bay, and is marked by an iron pole beacon surmounted by a white cylindrical topmark.

Capo d'Orso is the termination of a high, barren mount of the same name, the sharp, rocky summit of which, from some points of view, resembles a bear reclining, whence it takes its name. *See* view, page 639. Between the cape and Rada di Mezzo Schifo, a distance of 2¼ miles, the coast is fringed by rocky and foul ground extending seaward nearly 1½ cables.

A rocky shoal of small extent, having a depth of 5½ fathoms over it, lies in the channel between Capo d'Orso and Isolotto Porco, and bears 104° true, distant one mile from Capo d'Orso.

General charts 1189, 1780, 161b, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 50′ W.

Golfo Saline, a mile southward of Capo d'Orso, is nearly a mile deep and half a mile wide at the entrance, with 9 fathoms water in the centre, and 3 fathoms near the beach at its head; though open to the eastward it is somewhat protected by Punta Rossa, Isole Caprera.

Anchorage.—There is anchorage at the entrance and within the bay, in from 8 to 12 fathoms water, over a bottom of weed.

GOLFO DI ARSACHENA.—From Golfo Saline the coast trends to the southward for a distance of 3⅓ miles to the head of the Golfo di Arsachena. From Capo Tre Monti, on the east side of entrance, the gulf is about 2⅔ miles deep, three-quarters of a mile wide, with from 5 to 11 fathoms water, over mud and weed, and affords shelter to all classes of vessels; this anchorage was much used by Lord Nelson.

The head of the gulf as well as its western shore is shallow, and should be cautiously approached; off the eastern point there is a rock nearly a third of a mile off, but above the shore is less foul. The entrance to this gulf, open to the north, is formed between Punta Arsachena, on the west, and Capo Tre Monti on the east, the former being 2¾ miles to the southward of Capo d'Orso, and the latter 3 miles south-east of the same cape.

Beacon.—A rock, with 5 feet water over it, situated 170° true, distant 3¼ cables from Punta Arsachena, is marked by an iron pole beacon, surmounted by a sphere.

Capo Tre Monti (*Lat. 41° 11′ N., Long. 9° 24′ E.*), the termination of a height with three peaks immediately within it, is bordered on its west side by shallow water, which extends off about a quarter of a mile. The whole space between Capes Orso and Tre Monti affords shelter from all winds, and is protected by Caprera and the other islands from the sea caused by northerly gales.

A shoal extends 1½ cables north-west of Punta Battistone, one mile eastward of Capo Tre Monti.

Secca Tre Monti.—A rocky shoal, with 17 feet water over it, lies 348° true, distant 8 cables from Capo Tre Monti; there are depths of from 14 to 21 fathoms between.

The south-west point of Isola Santo Stefano just open of Capo d'Orso, bearing 300° true, leads to the northward of Secca Tre Monti.

Light-buoy.—A light-buoy, exhibiting a *flashing red* light *every three seconds*, thus:—flash, *three-tenths of a second;* eclipse, *two and seven-tenths seconds;* is moored at a distance of half a cable, 64° true, from the centre of Secca Tre Monti. It is visible in clear weather from a distance of 6 miles. The light support has horizontal red and black bands.

General charts 1189, 1780, 161b, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.

Anchorage.—At the entrance to the gulf and half a mile off either point, there will be found depths of from 7 to 11 fathoms, over good holding ground, and sheltered from all winds, especially those from the eastward, round south, to about N.E. This anchorage is named Rada di Arsachena, a fair berth is in 11 fathoms water, on the parallel of Capo Tre Monti, half-way between it and the western shore; inside the gulf the 5-fathom line extends generally from 3 to 4 cables from the shore on either side, leaving only a narrow vein of depths of from 6 to 10 fathoms between.

Prohibited anchorage.—Anchorage is prohibited within the area bounded to the eastward by a line joining Isoli Pecora and Cappuccini, and to the westward by a line joining Isolotto Porco and Capo Tre Monti.

Landing is prohibited in the vicinity of Capo Tre Monti battery, also on any part of the coast between Punta Battistone, Capo Tre Monti, and Baia Mucchi-bianchi.

Water.—A small stream runs into the head of the gulf, and water can be procured on the west side.

Capo Ferro. — From Capo Tre Monti the coast, trending in a general easterly direction to Capo Ferro, forms several coves and projecting points. This cape, the north-east extreme of Sardinia, is moderately high, rugged, and bold on its north-east side; and of a dark, iron red colour, with a table summit. Some rocks above, and others under water, lie off its north-east part, but not exceeding a cable from the shore; others to the south-east of the cape at about 2 cables from the shore.

LIGHT (*Lat. 41° 9′ N., Long. 9° 37′ E.*). On the hill, at the north-east part of Capo Ferro, is a yellow circular tower, 59 feet in height, and surmounting a dwelling, which exhibits, at an elevation of 171 feet above the sea, a *fixed* and *flashing white* light *every thirty seconds*, thus:—fixed, *fourteen seconds;* partial eclipse, *seven and a half seconds;* flash, *one second;* partial eclipse, *seven and a half seconds;* it is visible in clear weather from a distance of 16 miles.

Cape Ferro lighthouse.

From a window in the same tower a *fixed red* light is exhibited at an elevation of 140 feet above the sea, which, in clear weather, is visible from a distance of 5 miles. For arc of visibility, *see* Light list and plan.

Signal station.—Semaphore.—About 2 cables east-south-eastward of Capo Ferro lighthouse is a semaphore, 151 feet above the

General charts 1189, 1780, 161b, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.

sea, with which vessels can communicate; the semaphore is worked both by day and night. Signals respecting submarine vessels are made here.

Cala Liscia di Vacca, immediately west of Capo Ferro, is more than half a mile deep, and nearly the same broad, with from 7 to 14 fathoms water; it has good holding ground, and affords shelter from all winds for small vessels. Cappuccini, a small islet, lies on the northern side of the entrance of the cove, about a quarter of a mile from the land of Capo Ferro, and midway between there is a depth of 3¾ fathoms, with rocks on both sides of the channel.

Anchorage.—The anchorage, southward of the islet, is in about 10 fathoms water, over weed, 2 cables distant from the shore; off the south side of the cove is a small rock and shoal, lying 1½ cables from the shore.

Isola Biscie, lying about a quarter of a mile northward of Capo Ferro, is about half a mile in length in a north-westerly and south-easterly direction, and 3 cables in breadth, low, barren, with several rocks around it, the largest being on the south-west side. A group of rocks lies 4 cables northward of Isola Biscie, and in the channel between there is 3¼ fathoms water.

The channel formed by Capo Ferro and Isola Biscie is clear and deep, having a depth of 13 fathoms in mid-channel, and is frequently used by vessels from the ports on the east coast of Sardinia to Maddalena, and vice versâ. *See* also Caution and Prohibited passage, page 647.

Secca delle Biscie (*Lat. 41° 11′ N., Long. 9° 32′ E.*), nearly 1½ miles north-eastward of the centre of Isola Biscie, consists of four rocky heads in a space about 3½ cables in extent, in an easterly and westerly direction; on the western head the least depth is 2¼ fathoms, and on the eastern 3¼ fathoms; there are 9 and 12 fathoms water around, and, between it and the island, depths of from 15 to 22 fathoms; from the least water, on the western head, Capo Ferro lighthouse bears 193° true, distant nearly 2 miles. The *red fixed* light on Capo Ferro shows over this shoal.

Secca Pecora, about a cable in extent, and having 2¾ fathoms water over it, lies 316° true, distant 5 cables from the north-west point of Isola Biscie. A rocky patch about half a cable in extent, and having 3¼ fathoms water over it, lies 283° true, distant 3 cables from the same point. The description of the coast of Sardinia is continued on page 654.

INTERMEDIATE ISLANDS (Arcipelago della Maddalena).—The several islands lying off the north-east coast of Sardinia, and between it and Corsica, are known as the Intermediates (Arci-

General charts 1189, 1780, 161b, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 50′ W.

pelago della Maddalena); they are composed of red granite, and form, with the Sardinia coast, secure shelter for any class of vessels.

Isola Razzoli, the north-western of the group, is 1⅓ miles in length in a north-westerly and south-easterly direction, and 8 cables in breadth, rocky and arid; Monte Cappello, near the southern end, is 213 feet above the sea. There are two coves, one on the east, the other on the west, but they are only suitable for fishing boats. Two small islets named Callot and some sunken rocks lie about a cable off the north end; and Secca di Razzoli, having 4¼ fathoms water over it, lies 310° true, distant half a mile from the lighthouse. *See* view, page 647.

LIGHT (*Lat. 41° 18′ N., Long. 9° 20′ E.*).—On a ridge one cable within the north-west point of Isola Razzoli, on the south side of the east entrance to Bonifacio strait, is a white tower, 89 feet in height, with a square base, which exhibits, at an elevation of 282 feet above the sea, an *occulting white* light with a *red* sector *every nine seconds*, thus:—light, *six seconds;* eclipse, *three seconds;* the *red* sector shows over Secca Lavezzi; the *white* light is visible in clear weather from a distance of 18 miles, and the *red* light from 15 miles. For arc of visibility and sector, *see* Light list and plan. (Reported irregular, 1912.)

Isola Santa Maria, 161 feet above the sea, and cultivated, is separated from the east side of Razzoli by a narrow channel only half a cable wide and 3 feet deep; the two islands, of nearly equal extent, appear as one. The north end of Santa Maria is nearly united to Isolotto La Presa, which is 164 feet above the sea, and about half a mile in length, in an east and west direction; it forms, with Santa Maria, Baia Bacicia, open to the westward, with 12 to 18 fathoms water in the middle, sheltered from all winds but those from the north-west, and terminating in a beach.

There is a small cove with a beach on the south-east coast, off which, in case of necessity, small vessels may obtain shelter with off-shore winds. A rocky patch with 2 feet water over it lies about 1½ cables off the east point of the cove, and other shoals are reported to exist, so great caution is necessary until a proper examination has been made; several rocks above water lie off the west point.

LIGHT.—On Punta Filetto, the eastern extreme of Isola Santa Maria, a lighthouse is being constructed which, when completed, will exhibit an *occulting white* light.

Isola Budelli, lying south-westward of Razzoli and Santa Maria islands, is barren, and of about the same extent as the others; Monte Budelli, on the south side, is 285 feet above the sea. It forms with

Plan 2157, Maddalena and adjacent islands. Var. 9° 50′ W.

the southern coasts of the other two islands, a curved channel named Canalletto, a quarter of a mile wide, but the south-east entrance to it is obstructed by a group of rocks named Cecca di Morto, leaving only a boat passage between them and Isola Budelli.

Beacon.—There is a white masonry beacon on the southern point of Isola Budelli. This beacon, in conjunction with one on Guardia dell Turco (Isola della Maddalena), marks the limit of the Sardinian tunny fisheries.

Secca Budelli, with a depth of 3¾ fathoms, lies south-westward of Punta Cisterna, the west extreme of Isola Budelli, distant 6 cables.

Isolotto Corcelli, Barrettini, Barrettinelli. — The island of Santa Maria forms, with the north extremity of Maddalena, a passage 2¼ miles wide, which is obstructed by four large and some smaller islets; the three northern islets are named Corcelli, the western 102 feet above the sea; the centre Barrettini (131 feet), and the southern Barrettinelli.

Passo di Santa Maria (*Lat. 41° 18′ N., Long. 9° 24′ E.*), the channel between Santa Maria and the islets, is half a mile wide, and has general depths of from 9 to 13 fathoms, but nearly in mid-channel is Secca Barrettini, about half a cable in extent, and having 3½ fathoms water over it. From the shoal the south-west extreme of Isolotto Corcelli bears 130° true, distant 3½ cables; its position is generally perceptible from the strong current ripple near it. Vessels should keep on the western side of mid-channel.

Passo di Barrettini (Barrettinelli), the other channel between Isolotto Barrettinelli and Maddalena, is half a mile wide, and, with the exception of a patch with 9 fathoms water over it, has depths of from 26 to 33 fathoms. By keeping in mid-channel, there is no difficulty in passing through the channel. *See* view, page 647.

The channel between Corcelli and Barrettini islets is 2 cables in width, between the 5-fathom lines, and has depths of from 10 to 13 fathoms.

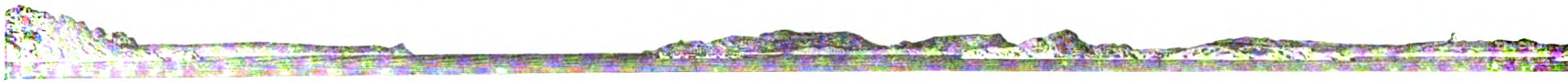
Isola Spargi, 1½ miles to the southward of Budelli, and about the same distance from the coast of Sardinia, is nearly circular, 1½ miles in diameter, and more populous than any of the others; Guardia Preposti, the highest point near the south end, is 509 feet above the sea. On the south-west side are two coves named Cala d' Arga and Cala Corsara.

A rocky shoal, with 4¾ fathoms water over it, lies eastward, distant 5 cables from Punta Bonifazzina, the north-east point of the island.

General charts 1189, 1131, 1780, 161b, 676, 2158a, 449.

Isola Razzoli lighthouse, bearing 85° true, distant 3 miles.

Isola Budelli.



Punta Marginetto. *Punta Falcone.* *Isolotto Barrettinelli.* *Isolotto Barrettini.* *Razzoli lighthouse, bearing 291° true.*

Passo di Barrettini (Barrettinelli).

(a)

Isolotto Giardinelli. *Guardia Vecchia, bearing 219° true, distant 4 miles.*

(b)

Guardia del Turco. *Punta Marginetto.*

Isola della Maddalena (2 views).

Casa Garibaldi *Tejalone (Teialone), bearing 49° true, distant 3 miles.* *Monte Fico.*

Isola Caprera.

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.

Washington rock, half a cable in diameter, and having a depth of 3¾ fathoms, lies with Punta Bonifazzina bearing 124° true, distant one mile.

Secca Corsara, with 1½ fathoms water over it, and steep-to, lies a quarter of a mile from the south-west end of the island.

Buoy.—A square buoy with an iron mounting surmounted by a red cone is moored on the south side of the rock.

Clearing mark. — The south-west point of Isola di Santo Stefano touching Punta Sardegna, bearing 123° true, leads southward of Secca Corsara. *See* view, page 639.

Isola Spargiotto (*Lat. 41° 15′ N., Long. 9° 19′ E.*), 157 feet above the sea, lies about 4 cables westward of Spargi, and the channel between being foul, should not be navigated; Spargiottello, a small rock, is situated on the north-west side of Spargiotto, and a rock, with 9 feet water over it, lies a cable westward of the islet, and one with a similar depth, at the same distance south-west of it.

Channels.—Caution.—Between Spargi and Maddalena there is a clear channel 8 cables in width, with depths of from 21 to 23 fathoms, which is used by vessels bound to and from Maddalena, and between Spargi and the coast of Sardinia a channel, one mile wide, has depths of from 21 to 25 fathoms in the centre. Vessels passing through the various channels surrounding Isola Maddalena are obliged to hoist their national flag. No dependence should be placed on the beacons or buoys.

PASSAGE PROHIBITED. — Merchant vessels are prohibited from entering the area contained within the limits described below, unless bound for any port within those limits:—

(*a*) By a line joining Capo Ferro semaphore and the summit of the south-western of Isolotti Monaci.

(*b*) By a line joining the summit of the south-western of Isolotti Monaci to the northernmost extreme of the largest of Isolotti Barrettini.

(*c*) By a line joining the north-western islet of Isolotti Barrettini to the northern extreme of Isola Spargiotto.

(*d*) By a line joining the northern extreme of Spargiotto and Secca Corsara buoy.

(*e*) By a line joining Secca Corsara buoy and the northern extreme of Punta Sardegna.

(*f*) By the coastline between Punta Sardegna and Capo Ferro semaphore.

The prohibited area is shown on plan by pecked lines.

ISOLA DELLA MADDALENA, rather less than a mile eastward of Spargi, and the largest of the group, is rocky, and its shores are fringed with rocks; Guardia Vecchia, near the south-west

General charts 1189, 1131, 1780, 1616, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.

end, is 499 feet above the sea, and the highest point of the island, a quarter of a mile further north, 522 feet. Punta Marginetto, the north extreme of the island, is low, and surrounded by rocks at the distance of 1½ cables, and between it and Isolotto Barrettinelli is the pass, already mentioned. *See* views *a* and *b*, facing page.

Isolotto Giardinelli, on the east coast, 2½ miles southward of Punta Marginetto, is low, nearly circular, half a mile in diameter, and close to the shore; it is fringed with rocks and shoals (more especially round the eastern shore), which extend off more than 2 cables; westward of the islet and between it and some rocks off Maddalena, is La Peticchia, a narrow inlet half a mile deep, open to the north-east, having depths from 3 to 7 fathoms.

Passo della Moneta, about a third of a mile in width, shallow and full of rocks, is between the south-east point of Isolotto Giardinelli and Isola Caprera, and from Punta Moneta, the south-east extreme of Maddalena, a breakwater, with an opening, 82 feet in width, crossed by a swingbridge, extends to Punta Puntarella in Caprera, and affords shelter to the anchorage off the naval establishment.

Guardia del Turco.—Beacon.—On Guardia del Turco, the northern summit of Isola della Maddalena, 276 feet high, is a white masonry beacon. A line drawn through this beacon, and a similar one on the southern extreme of Isola Budelli, marks the northern territorial limit of the tunny fishery between Sardinia and Corsica.

Plan 564, Maddalena and approaches.

Isolotto Chiesa, about a mile westward of Punta Moneta, is about 1½ cables in diameter and 52 feet above the sea; from its south-east end a mole extends in a south and south-west direction for a distance of 300 yards; the east side of the island is connected to the main island by a bridge.

LIGHTS (*Lat. 41° 13′ N., Long. 9° 25′ E.*).—A *fixed red* light is exhibited, at an elevation of 16 feet above the sea, near the Port office, Cala Gavetta.

A *fixed white* and a *fixed red* light are exhibited, at an elevation of 26 feet and 33 feet above the sea, respectively, 22 yards westward of the head of the landing pier, Piazza Umberto; a *fixed white* light is exhibited, at an elevation of 75 feet above the sea, from the tower of the Commandant's house; these lights indicate the channel between Secca del Parau and Isolotto la Paura.

Two *fixed white* lights, 2½ feet apart, are exhibited, at an elevation of 18 feet above the sea, from the western entrance point to Cala Chiesa.

On the south-west extreme of the mole at Isolotto Chiesa, two *fixed red* lights, placed vertically 6 feet apart, are exhibited, at an elevation of 33 feet above the sea, from an iron column, 28 feet high, and are visible in clear weather from a distance of 2 miles.

General charts 1189, 1780, 161b, 676, 2158a, 449.

Plan 564, Maddalena and approaches. Var. 9° 40′ W.

A *fixed green* light is exhibited, at an elevation of 49 feet above the sea, from a window at the eastern extreme of the central building of the Marine hospital, and a *fixed red* light, 23 feet above the sea, from the end of the Hospital pier. These lights are visible in clear weather from a distance of 2 miles, and kept in line lead through Rada di Santo Stefano, clear of the mooring buoys.

On the west side of the entrance to Cala Camicia a *fixed red* light is exhibited, 12 feet above the sea, from a staff on the coal wharf, and from the end of the landing pier on the east side a *fixed green* light is exhibited, at an elevation of 22 feet above the sea.

Wireless telegraph station.—There is a wireless telegraph station on Isolotto Chiesa, which is always open to the general public. The call letters are M.B.V.

Beacon.—About one cable south-westward of the light-column on the mole, is a red pole beacon, surmounted by a black and white cylinder, marking the south side of the channel between the mole and Isola Santo Stefano. This channel is only suitable for vessels of light draught, the least water being 2 fathoms.

Scoglio Nasse.—Beacon (*Lat. 41° 12′ N., Long. 9° 25′ E.*).—On Scoglio Nasse, a rock above water, lying three-quarters of a cable northward of the north-east extreme of Santo Stefano, is a white mast surmounted by a black flag; the rock is also white.

Buoys. — A black cask buoy is moored eight-tenths of a cable westward from the mole end, and between the depths are less than 6 feet.

Two buoys lie east-north-eastward of Scoglio Nasse, one distant half a cable is a pole surmounted with a sphere and a half sphere, and the other, a red buoy, marking the edge of the shoal water, distant eight-tenths of a cable.

A rock, with 6 feet of water over it, lies a quarter of a cable southward of the end of the Hospital pier, and is marked by a conical buoy.

A shoal, with 4¼ fathoms water over it, situated about 3 cables south-south-west of the coal wharves, is marked on its south side by a bell-buoy.

About a cable northward of this shoal is another, on which the depth is 2¼ fathoms; it is marked by a buoy, but is within the line of prohibited anchorage.

Naval establishment.—Between Punta Moneta and Isolotto Chiesa are two small coves, named Cala Camicia and Cala Camiciotto, and northward of the island is Cala Chiesa; along the shores of these three coves is the naval establishment, with barracks, coal stores, magazines, marine hospital, &c.

Dock.—There is a floating dock for torpedo boats only.

Repairs.—Small repairs to machinery can be executed; there are floating sheers lifting 140, 20, and 15 tons.

General charts 2157, 1189, 1780, 161b, 676, 2158a, 449.

Plan 564, Maddalena and approaches. Var. 9° 40′ W.

Prohibited anchorage.—Anchorage is prohibited within the area, bounded on the northward by the south coast of Isola Maddalena, and to the southward by a line joining roughly the western end of Piazza Umberto, the extremity of Isolotto Chiesa mole, Punta Moneta, and the swingbridge. A line of buoys marks the limit, which is shown by a pecked line on the chart.

Mooring buoys.—There are two mooring buoys in Cala Chiesa.

Rada di Maddalena, between Maddalena town and Isola Santo Stefano, is exposed from the westward, from which quarter the wind blows with the greatest force. Vessels that cannot enter Cala Chiesa, anchor to the south-east of the town in 9 or 11 fathoms water, and make a cable fast to the shore at the entrance to the bay. On the east side of Isola Santo Stefano is Rada di Santo Stefano. *See* page 653.

Town.—The town of Maddalena is situated on the western side of Cala Chiesa; the inhabitants, numbering about 8,033, are mostly seafaring.

Communication.—Steamers run twice weekly between Civita-Vecchia and Golfo Aranci; weekly to Porto Torres, Leghorn, and Genoa; and fortnightly to Cagliari; telegraphic communication with all parts. The telegraph office is open till midnight.

Coal and supplies. — About 20,000 tons of coal are kept in Government hands, but none for sale; water is obtained by distillation, and about 2,200 tons kept stored.

Signal station.—Semaphore (*Lat. 41°13′N., Long. 9°24′E.*). —There is a semaphore on Guardia Vecchia, over the town of Maddalena, 499 feet above the sea, and near the most elevated part of the island; the hill is surmounted by a fort. The semaphore is worked both by day and night. Signals respecting submarine vessels are made here.

Plan 2157, Maddalena and adjacent islands.

Coast. — The coast, between the town of Maddalena and Forte Tegge, three-quarters of a mile westward, is bordered with rocks and shoals extending for a distance of 2½ cables; two islets of white colour, about 20 feet above the sea and a cable apart, lie a short distance southward of the fort.

Secca di Forte Tegge, with 1½ fathoms water over it, is situated 186° true, distant 3½ cables from the fort.

Beacons and buoys.—A white iron pole beacon, surmounted by a flag, marks an isolated shoal, 4 cables westward of Forte Tegge, and another is placed on the shoal to the southward of White rock: a white cask buoy marks the south extreme of Secca di Forte Tegge,

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.
and between this and the town of Maddalena are several beacons and buoys, marking the channel.

For description of Secca di Mezzo Passo and Secca del Parau, *see* page 641.

West coast.—Punta Testicciole is 1½ miles northward of Forte Tegge, and between is Cala Francese, only suitable for small vessels. The west coast of Maddalena to Punta Marginetto, the north extreme of the island, a distance of 2⅔ miles, is fringed by small islets or rocks, some of which are more than 2 cables from the shore. A low salient point, named Abbatoggia, nearly a mile south-westward of Punta Marginetto, forms with the latter the entrance to Cala Stagnotorto, an inlet about three-quarters of a mile deep, seldom frequented, with 20 fathoms water at the entrance, and 4 fathoms near its head.

ISOLA CAPRERA, the eastern of the group, lying close to the south-east side of Maddalena, is somewhat less in extent, and has a deeply indented coastline. It is also the highest of the group, Punta Tejalone (Teialone) in the centre attaining an elevation of 696 feet above the sea. It is more fertile than Maddalena, and has copious springs; upon the west side is the unpretending dwelling and farm of the proprietor. This island was given to General Garibaldi by the King of Italy. *See* view, page 647.

Cala Portese, on the south-east side of Caprera, is two-thirds of a mile deep, and terminates in a sandy beach; it has depths of 20 fathoms at the entrance, shoaling to about 2 fathoms at the head, but being open to the north-east is seldom visited. It is formed by a piece of irregular forked land, at the east end of which is Isolotto Pecora, 49 feet high, with a white obelisk on the summit and a large rock eastward of it. Isolotto Pecora lies 1½ miles north-west of Isola Biscie (page 644), the channel between having from 14 to 30 fathoms water.

Punta Rossa (*Lat. 41° 10′ N., Long. 9° 28′ E.*), the south extreme of Caprera, is the termination of a low, narrow prong extending three-quarters of a mile to the southward. There is a battery on Punta Rossa, and sheds along the western coast facing Isolotto Porco.

Secca di Punta Rossa, with 3 feet water over it, extends nearly 2 cables south-west of the point and three-quarters of a mile to the south-westward of Punta Rossa is Secca Tre Monti, mentioned in page 642.

Buoy.—A white buoy, surmounted by a globe, is moored near the extremity of Secca di Punta Rossa.

Landing is prohibited in the vicinity of Punta Rossa battery.

General charts 1189, 1780, 161b, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.

Isolotto Porco, 82 feet high, and nearly half a mile to the north-west of Punta Rossa, has a white hut on the summit and a white beacon at the north extreme; there is good anchorage on the eastern side of the islet for small vessels, in 5 or 6 fathoms water.

Monte Fico, the south-west extreme of Caprera, is 233 feet above the sea, and apparently isolated. Porto Palma, on the east side of Monte Fico, is nearly half a mile deep, and 3 cables wide; it has from 9 to 16 fathoms water in the entrance shoaling to 3¼ fathoms at the head, but in the middle of the entrance there is a shoal with 4¾ fathoms water over it, and about half a cable south-south-eastward of this shoal is another with only 4 feet over it. Although open to the south it affords shelter for small vessels from all winds; some rocks lie a cable off its eastern entrance point.

Beacon. — A white stone beacon, surmounted by a globe, is situated on the small isolated rock off the south-west corner of Punta Fico.

Buoy.—A shoal extending about a cable south-westward of Punta Fico, the south-western extreme of Caprera, is marked by a square black buoy, surmounted by a castle and cone, vertex upwards.

Passo della Moneta.—Caprera is separated from the eastern side of Maddalena by Passo della Moneta, which is a third of a mile wide, shallow, with several rocks, and only suitable for small vessels. (*See* page 648.) The western coast of Caprera is low, scattered with rocks, and has several coves which are frequented by fishing boats; it trends 4 miles in a north-north-easterly direction to Punta Galera.

Beacons and buoys.—The channel is marked by beacons and buoys.

Directions. — Only small vessels can pass through Passo della Moneta, and when intending to do so the signal I.F.R. of the International code should be made two hours previously to the signal station at Guardia Vecchia, that the necessary arrangements may be made for opening the swingbridge.

Isolotti Monaci, a small group, only a little above the sea, and steep-to on all sides, lie 1⅓ miles eastward from Punta Coticcio (Caprera island), with 38 fathoms water in the channel between, and from 20 to 31 fathoms between the islets and Secca dei Monaci. The *red* light of Capo Ferro shows over the islets. Vessels of all classes may pass through either channel, taking care to avoid Secca dei Monaci, the marks for which are given below. *See* page 647 for Prohibited passage.

Secca dei Monaci (*Lat. 41° 13′ N., Long. 9° 33′ E.*), situated 1 1/10 miles eastward from the north extreme of Isolotti Monaci, is a rocky danger about a cable in extent, with 1¾ fathoms over it, steep-

General charts 1189, 1780, 161b, 676, 2158a, 449.

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.

to, with about 20 fathoms close around. The *red* light of Capo Ferro shows over the shoal, and the *flashing white* light of Isola Tavolara is reported to be visible from its neighbourhood.

Clearing marks. — Guardia del Turco beacon, on the northern summit of Maddalena, well open of the northern extreme of Caprera, bearing 290° true, leads to the northward of the shoal; and Capo Ferro lighthouse in line with the eastern extreme of Isola Biscie, bearing 201° true, leads to the eastward of the shoal, but will lead over Secca delle Biscie if continued on too far to the southward.

ISOLA SANTO STEFANO, about 3 cables southward of Maddalena, is nearly 4 miles in circumfernce; at the north end Poggio Tondo is 266 feet, and at the south end Monte Guardia Moro 299 feet, above the sea. On the south-west side, Cala di Villamarina, a small cove which recedes 3 cables to the north, is a quarter of a mile wide, and affords shelter to small vessels, which moor with a cable to the shore. *See* view, page 654.

A small fort, named San Giorgio, stands on a height on the west side of the cove, and 1½ cables south of it is Casa la Torre, a square tower with a building near it. From the east side of the island no dangers extend for a distance of more than a cable, but on the north-west coast the 5-fathoms line is about double that distance from the shore; from the north end shoals extend across to Cala Chiesa. *See* page 649.

Nearly 3 cables westward from Isolotto la Paura, on the west side of Santo Stefano, is Secca del Parau, described on page 641; the channel between the islet and the rocks has from 6 to 8 fathoms water. For leading lights through this channel, *see* page 648.

Buoys.—Two small white cask buoys mark the edge of the shoal ground extending from the north-west coast of the island, one about 2 cables north-eastward of Isolotto la Paura, and the other about 2 cables south-westward of the north-western point of the island.

Rada di Santo Stefano (*Lat. 41° 12′ N., Long. 9° 26′ E.*), between Punta Coda and Punta Stagnali (Caprera) on the east, and Punta Santo Stefano and Punta Sassu (Santo Stefano) on the west, is a space nearly a mile square, with depths of from 18 to 20 fathoms, over a bottom of sand and weeds.

Mooring buoys. — There are thirteen mooring buoys; their positions will be best seen by reference to the chart.

Anchorage.—Large vessels may anchor along the whole eastern coast of Santo Stefano; small vessels, during westerly winds, anchor

Plan 2157, Maddalena and adjacent islands. Var. 9° 40′ W.

at the head of the road, near the naval establishment, in depths of from 3½ to 7 fathoms; it is stated that the holding ground is not good, that heavy squalls are frequent, and at times so strong as to cause vessels to drag their anchors; mooring buoys are placed for the use of the Italian vessels of war. For leading lights, *see* page 648.

Estuario della Maddalena. — The foregoing islands form, with the coast of Sardinia, a tortuous channel, having very irregular depths, leading into Bonifacio strait, and where, on either side, are several good anchorages. Though the narrowest parts of this channel average only about half a mile in breadth, being marked by beacons and buoys, it may be navigated with safety. *See* view, page 639.

Passage prohibited.—Caution.—*See* page 647.

Fishing is prohibited within the area bounded on the eastward by a line joining Isoli Pecora and Biscie and Capo Ferro, and on the westward by a line joining Isole Cavalli, Secca Corsara (Isola Spargi), and Cala dell' Inferno (Maddalena).

EAST COAST OF SARDINIA. — Coast. — From Capo Ferro the coast runs south-eastward for a third of a mile, and then forms a small bight, with a cove and beach at its head. There is anchorage for small vessels, with westerly winds, in 4 fathoms of water, off the cove; coasting vessels use this anchorage when unable to proceed westward.

Shoal water extends nearly 2 cables north-eastward from the northern point of the bight.

Secca del Cervo (*Lat. 41° 9′ N., Long. 9° 33′ E.*), situated half a mile north-eastward of the north entrance point of Porto Cervo, and on the southern side of the bight just described, is a rocky shoal extending 3 cables in a north-easterly and south-westerly direction, and nearly 2 cables in breadth, with depths of from 7 to 18 feet over it. It is a quarter of a mile from the coast, and there is a narrow channel about a cable wide, with depths of from 4 to 6 fathoms in it, between the shoal and the shoal water off the coast.

Clearing mark. — Punta Tejalone, the summit of Caprera, a little open to the northward of the north-eastern side of Isola Biscie, bearing 318° true, leads to the eastward of Secca del Cervo. *See* view facing page.

Chart 163, Cape Ferro to Port Brandinchi, &c.

Porto Cervo, a small port, about 1¼ miles southward of Capo Ferro, extends to the westward for a distance of half a mile, and is 2 cables in breadth, but difficult of access for any but small vessels, the entrance being only half a cable wide. It is sheltered from all winds, but as the entrance is open to the north-east, a swell sets in

General charts 1189, 1780, 161b, 676, 2158a, 449.

Forte San Giorgio,
bearing 308° true, distant 1¼ miles.

Punta Santo Stefano.

Isola Santo Stefano.

Capo Ferro lighthouse,
bearing 266° true, distant 1¼ miles.

Isola Biscie.

Scogli Biscie.

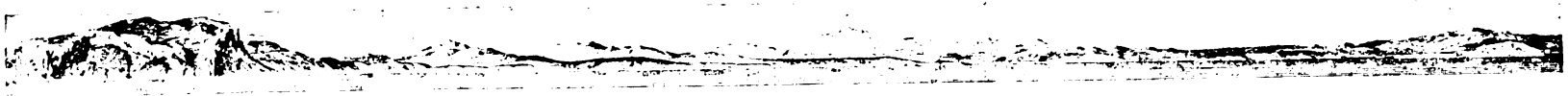
Punta Tejalone.

Porto Cervo.

Capo Ferro lighthouse
in line with Monte Turrita,
bearing 187° true,
distant 4 miles

Isola Biscie.

Monte Tre-Monte.
Monte Limbara (distant).



Capo Figari signal station,
bearing 227° true, distant 3½ miles.

Monte Sa Curi.

Monte Congianus.

Punta Volpe.

Isola Soffi.

Isola Mortorio.

Golfo di Congianus.

Chart 163, Cape Ferro to Port Brandinchi, &c. Var. 9° 40′ W.

with winds from that quarter. There are depths of from 6 to 8 fathoms in the outer parts, and 3 fathoms half-way in, over mud bottom.

Water may be obtained from a small stream.

Capo Libani, 3 miles south-eastward of Capo Ferro, is barren and red, and commanded by elevated land named Monte Zoppo, 285 feet above the sea. Golfo Pevero, just to the westward of the cape, is 8 cables wide at entrance and 6 cables deep, open to the north-east, with some small islets and rocks skirting the shore. With off-shore winds it is frequented by coasters, which anchor in 6 or 7 fathoms water.

Close to the cape is an islet and some rocks of the same colour as the cape, which, with those a little to the north, shelter the bays from easterly winds.

Isole dei Libani. — At half a mile to the north-eastward of the cape is an island, 82 feet above the sea, and of a dark colour, surrounded with islets and rocks. Passo delle Galere, the passage between the islets and the land, is 3 cables wide, and 5 fathoms deep in the middle.

Monte Turrita, 1,381 feet high, is 2¼ miles west-south-westward of Capo Libani; it will be known by the rocky inclination of its summit, which is a good mark for this part of the coast. *See* view, page 654.

Golfo di Congianus lies between Capo Libani, on the north, and Capo Figari, on the south; it comprises the bays of Volpe, Cognena, and Marinella, and the islands now described. *See* view, page 654.

The depths are from 50 fathoms, at the entrance of the gulf, to 20 fathoms within the bays, the bottom chiefly of sand and mud.

Isolotti Poveri. — Punta Capaccio is 1$\frac{1}{10}$ miles southward of Capo Libani, and half a mile south-east of it are three small islets and sixteen rocky heads, covering an extent of three-quarters of a mile in a north-easterly and south-westerly direction, with a breadth of about half a mile; they form a channel with the coast about 4 cables wide, and midway 10 fathoms deep; but as the passage is narrowed by reefs on both sides, it should not be used unless in case of necessity. The group is fringed with reefs on the north side.

Isola Mortorio (*Lat. 41° 5′ N., Long. 9° 36′ E.*), the highest of a group of islands lies about 3 miles south-eastward of Capo Libani, is of an irregular figure, about 3 miles in circuit, 249 feet above the sea at its north-east end, and steep-to at its extremities, but rocky in

Chart 163, Cape Ferro to Port Brandinchi, &c. Var. 9° 40′ W.

the small bays which it forms. Two black rocks, steep-to, named Mortoriotto (Testa di Cane), lie nearly half a mile north-eastward of it, with 26 fathoms water in mid-channel between. An islet named Camize lies a third of a mile westward of Mortorio, with two rocks on its northern side; the channel between Camize and Mortorio has depths of from 8 to 10 fathoms.

Isola Soffi, a mile westward of Mortorio, and of equal extent, is 105 feet above the sea at its north-east end, and 1¼ miles distant from the coast; two islets, Le Camere, 63 and 86 feet high, nearly united, surrounded by rocks and shallow water, lie at its north-east end. Between the rocks and Isola Camize there are 6 fathoms water.

Anchorage.—Cala Volpe, 3 miles south-south-westward of Capo Libani, is a mile wide, and three-quarters of a mile deep. In the bay there are two coves with beaches; the northern is half a mile deep, 2 cables wide, open to the south, and affords shelter for small vessels in from 1¾ to 2¾ fathoms water.

There is also anchorage in the centre of the bay, in depths of from 7½ to 11 fathoms, over mud bottom, partially sheltered from the eastward of the off-lying islands. It is sometimes named Ancoraggio di Soffi, from the island of the same name.

Golfo Cognena (*Lat. 41° 2′ N., Long. 9° 32′ E.*).—Punta Ligata, or Liscia Ruja, which forms the south extreme of Cala Volpe, is low, projects eastward, and is skirted with rocks at about a cable's distance. Punta Volpe, 2 miles south-eastward of Punta Ligata, is the termination of a small peninsula fringed with rocks to a distance of nearly 2 cables. The intermediate coast forms Golfo Cognena, in the southern part of which an inlet, Porto Cognena, extends about 1½ miles to the south-westward. About 1½ miles westward of the head of Porto Cognena is Monte Congianus, a peak 2,128 feet high. *See* chart 161b.

In the outer part of the inlet there are from 2 to 4 fathoms water, but all the inner part is shallow, the depths varying from 4 to 6 feet. In case of necessity, during fine weather, a vessel may anchor in this gulf in any convenient depth. Two circular coves, with steep sides, about 2 cables in diameter, are situated between the entrance of the inlet and Punta Volpe, and are used by small coasting vessels and fishing boats. The western has a depth of 3 fathoms; Porto Rotondo, that nearest the point, has a depth of 1½ fathoms, is half a mile distant from the former, and is sheltered from all winds.

Golfo Marinella.—Punta Canisone, 1½ miles south-eastward of Punta Volpe, has a rocky shoal extending nearly a quarter of a

Chart 163, Cape Ferro to Port Brandinchi, &c. Var. 9° 40′ W.

mile northward of it; the intermediate coast forms Golfo Marinella, 2 miles deep, and open to the north-east. Cala Sabina and Cala Marinella Nuova, two rocky coves, are on the south-east side of the bay, and another, named Marinella Vecchia, is situated at its head. The railway skirts the south shore of Golfo Marinella.

Communication.—There is a railway station at Aranci, about 4 miles to the eastward, in Baia degli Aranci, and telegraphic communication from Marinella Vecchia.

Submarine telegraph cable.—A telegraph cable is laid between Marinella Vecchia and the west coast of Italy.

Beacons with balls point out the direction of the cable, and mariners are cautioned not to anchor in the vicinity.

Coast.—The coast between Canisone and Spada points, a distance of 2 miles, is foul, and should not be approached nearer than 3 cables.

Capo Figari (*Lat. 41° 0′ N., Long. 9° 40′ E.*), about 3½ miles south-eastward of Punta Canisone, is a rocky head, and the termination of a white peninsula projecting in an east-south-easterly direction for a distance of nearly 2 miles. The cliffs on its north face are of a red colour, and the hill above it (in which there is a great break) is covered with verdure. The land in the interior is a continued chain of high mountains, descending with many ravines towards the indented shore.

Capo Figari is about 9 miles from Capo Libani, the intermediate coast forming the deep bight, Golfo di Congianus, already described. During winds from the north-west quarter, heavy squalls and eddies are experienced near the cape.

Signal station.—Semaphore.—A semaphore, with which vessels can communicate, is established at Capo Figari, at an elevation of 1,115 feet above the sea. Signals respecting submarine vessels are made here.

Golfo di Terranova.—Punta Timone, the north-east extreme of Isola Tavalora, lies 142° true, distant 3$\frac{3}{10}$ miles from Capo Figari, and between the points is the entrance to Golfo di Terranova, which extends nearly 10 miles westward, to the port and town of the same name. There is a depth of about 30 fathoms at the entrance, and within, general depths of 18 and 20 fathoms, over mud.

Firing ground.—Light-buoys.—Caution.—Annual firing practice for Italian vessels of war is carried out in Golfo di Terranova. The water area is situated between Punta Timone, Capo Ceraso, and Isolotto di Figarello; it is in the form of a polygon, and the angles are marked by buoys exhibiting *fixed white* lights, which are visible in clear weather from a distance of 2 miles.

General charts 161b, 676, 2158a, 449.

Chart 163, Cape Ferro to Port Brandinchi, &c. Var. 9° 40′ W.

Vessels are forbidden to enter the polygon, and the buoys should be left on the port hand when entering the gulf, and on the starboard hand when leaving.

Buoys are also laid out, annually, off Punta Figlio; the eastern one, which exhibits a *fixed white* light, lies 52° true, distant 1¾ miles from Isolotto Bocca light. Vessels must pass southward of these buoys.

Submarine vessels.—Caution.—Mariners are cautioned that exercises with submarines are frequently carried out in the approaches to Maddalena, at Baia degli Aranci, and in adjacent areas.

When the submarines are submerged, the escorting torpedo craft or tugs will hoist a square red flag at the masthead.

A similar flag will be hoisted from the semaphores of Guardia Vecchia (Maddalena), Capo Ferro, and Capo Figari, according to the locality in which the exercises are being carried out. The above flag may be lowered at any of the foregoing semaphore stations to signal to a vessel in sight, but it will be immediately re-hoisted on the appearance of another vessel.

All ships in sight of the escorting vessels should pay strict attention to any signals made to them by the International code. Such signals will be made to indicate the course, &c., to be steered in order to avoid collision, and may in urgent cases be accompanied by the firing of a gun.

When navigating in the above localities mariners are specially warned to look out for the periscopes of the submarines. In ordinary exercises the periscope of a submarine is surmounted by a short mast with a metal pennant.

Plan of Aranci bay on 163.

BAIA DEGLI ARANCI.—On the south side of Capo Figari, distant 1½ cables from the coast, is the high, pyramidal islet of Figarello, 426 feet above the sea, covered with brambles, and steep-to on its eastern side. Midway between the islet and coast there is 4 fathoms water. Cala Moresca, north of the islet, affords excellent shelter for coasters from all winds, and will accommodate five or six such small vessels.

Between Isolotto di Figarello and Punta Lepre, 2⅓ miles westward, is formed Baia degli Aranci, secure, commodious, and sheltered from all winds. Between Isolotto di Figarello and Punta Lepre there are depths of from 20 to 26 fathoms, diminishing gradually towards the shore.

Landmarks.—Monte Rotondo (Canale Torto), 302 feet high, lies about three-quarters of a mile north-westward from the head of the bay; there is a conspicuous ruined white house near the summit. There is another conspicuous white house, about three-quarters of a mile south-westward of Monte Rotondo, and two conspicuous white houses very close together about three-quarters of a mile east-south-eastward of Monte Rotondo. The railway station (close to the shore) is painted yellow, has a red roof, and is surrounded by trees; a conspicuous white house, with a red roof, surmounted by an obelisk, is situated about a cable northward of the railway station. A conspicuous white house is situated about 4 cables southward of the station.

Mole.—A mole extends in a south-westerly direction from the shore, for a distance of 240 yards from the north-east side of the bay. There is a depth of 19 feet near the quay within the mole.

General charts 161b, 676, 2158a, 449.

Plan of Aranci bay on 163. Var. 9° 40′ W.

Lights (*Lat. 41° 0′ N., Long. 9° 37′ E.*).—From an iron post, 18 feet high, on the molehead, a *fixed red* light is exhibited at an elevation of 26 feet above the sea, and in clear weather it is visible from a distance of 4 miles. Reported to be visible only one mile.

Two *fixed white* lantern lights are shown on the mole embankments.

Mooring buoys.—There are two mooring buoys on the south side of the mole, and four mooring buoys and a small buoy on the north side of the mole.

Anchorage.—A good berth for a large vessel is nearly a mile to the north-west of Isolotto di Figarello, and a third of a mile from the shore of the peninsula, with the south point of Isolotto di Figarello bearing 122° true, and the lighthouse 50° true. Small vessels anchor off the beach at the head of the bay. Westerly winds blow with the greatest force, and are the most inconvenient.

Communication.—There is a daily steamer to Civita Vecchia, and mails from Italy arrive daily; a steamer every week to Leghorn, Genoa, and to Cagliari, calling at intermediate ports; twice every week to Maddalena; railway communication with Terranova and Cagliari, and telegraphic communication.

Supplies of fresh provisions in small quantities may be obtained, but large supplies must be ordered from Cagliari or Terranova, and all water is brought by train.

Quarantine is strictly enforced; the Health office is close to the mole.

Chart 163.

Coast.—From Punta Lepre the coast has a south-south-westerly direction for 2½ miles to Punta Figlio, and at half a mile from Punta Lepre is Isolotto Porri, low, rocky, and surmounted by verdure; a shoal with 11 feet water over it, lies 5½ cables south-south-westward of the islet, and about 4 cables from the shore.

Buoy.—A red buoy is moored on the shoal off Isolotto Porri during the Italian annual firing practice.

Plan 3609, Port Terranova.

PORTO TERRANOVA (*Lat. 40° 55′ N., Long. 9° 32′ E.*).—The land in the immediate vicinity of the port of Terranova is low, marshy, and unhealthy. The entrance to this port, 4½ miles south-westward of Isolotto di Figarello, is about a cable wide, but obstructed by rocks and sand. (*See* view, page 663.) A channel about half a mile in length, half a cable in width, leads into Porto Terranova, and within the entrance the port opens out to about a mile in breadth, and is 2½ miles in length, in a westerly direction; for a distance of 1½ miles inside the dredged channel there is about 4½ fathoms water, but in the western part it is much encumbered with islets and rocks, a number of which extend nearly a mile into the bay from off the town, with a passage on either side. Porto Romano lies in the north-west part of the port.

Depths.—In the entrance channel there is a depth of 26 feet; inside the entrance, for a distance of 1½ miles, there is a depth of 22 to 29 feet; in the channel to the town there is a depth of 21 feet; off the town, in a small space of about one cable, there is a depth of 22 feet; in the channel to Porto Romano there is a depth of 19 feet, and in Porto Romano, 19 to 26 feet.

General charts 161b, 676, 2158a, 449.

Plan 3609, Port Terranova. Var. 9° 40′ W.

LIGHTS.—Isolotto Bocca (*Lat. 40° 55′ N., Long. 9° 34′ E.*). —On Isolotto Bocca, on the south side of the entrance, a white square tower, 72 feet in height, and surmounting a dwelling, exhibits, at an elevation of 80 feet above the sea, an *alternating fixed white* and *flashing red* light *every twenty-five seconds*, thus: — fixed *white, twelve seconds;* partial eclipse, *five and a half seconds; red* flash, *two seconds;* partial eclipse, *five and a half seconds;* it is visible in clear weather from a distance of 14 miles.


Isolotto Bocca lighthouse.

Near the southern limit of visibility the light is irregular, showing thus: — *white* flash, *one and a half seconds;* eclipse, *three and a half seconds;* two *red* flashes, occupying *two and a half seconds;* eclipse, *seventeen and a half seconds.*

For arc of visibility of both lights, *see* Light list, plan, and chart.

Isolotto Bianca. — An *occulting white* light *every three seconds*, showing thus:—light, *one and a half seconds;* eclipse, *one and a half seconds*, is shown at an elevation of 26 feet above the sea, from an iron column, 23 feet in height, surmounting a shed, painted black and white in stripes, and situated on Isolotto Bianca; in clear weather it is visible from a distance of 6 miles.

Quay.—On the south-east angle of the quay at Terranova Pausania is exhibited, from a steel column, 10 feet high, at an elevation of 12 feet above the sea, a *fixed red* light, which is visible in clear weather from a distance of 3 miles. This light shows *white* towards the town.

Light-buoys.—Two light-buoys mark each side of the channel into the port. The two on the north side have white and red bands, and each exhibit an *occulting green* light *every four seconds*, thus:— light, *two seconds;* eclipse, *two seconds.* The two on the south side have white and black bands, and each exhibit an *occulting red* light *every four seconds*, thus:—light, *two seconds;* eclipse, *two seconds.*

Beacons and buoys.—The channel above Isolotto Bianca to the anchorage off the town is marked by beacons and buoys.

The entrance to Porto Romano is marked by a red buoy on the starboard hand entering, and a black and white striped buoy on the port hand. There are two mooring buoys off the town quay, and two near the head of Porto Romano.

General charts 163, 161b, 676, 2158a, 449.

Plan 3609, Port Terranova. Var. 9° 40′ W.

Anchorages. — There is temporary anchorage for large vessels about 1½ miles from the entrance, in from 8 to 11 fathoms water, over mud.

There is anchorage southward of Punta Figlio, in 5½ fathoms, 2 cables from the land, with the Custom-house bearing 285° true. The anchorage inside is about 4 cables west-south-westward of Punta Ginepro, in 23 to 26 feet of water, over mud.

Small vessels can lie alongside the quay off the town.

Town. — At the head of the port is the small town of Terranova Pausania, having a population of 4,348, and a small trade in cattle, cork, and charcoal. The Fiume Padrogiano disembogues by two mouths on the south side of the harbour; one or two smaller streams also enter the sea. There are the ruins of a cathedral, and Roman remains of the ancient Olbia in the immediate vicinity.

Communication.—Weekly steamers to Genoa, Leghorn, Maddalena, Aranci, and to Cagliari, calling at the intermediate ports on the east coast. Railway communication with Aranci and Cagliari, and telegraphic communication. The telegraph office is open till midnight.

Supplies of fresh provisions are plentiful, and there is an abundant supply of good water from a hose on the quay.

Chart 163, Cape Ferro to Port Brandinchi, &c.

Capo Ceraso (*Lat. 40° 55′ N., Long. 9° 39′ E.*). — From the entrance to Porto Terranova the coast trends eastward, and is low and marshy, forming several coves and points as far as Capo Ceraso, a distance of 3½ miles; it is fringed by islets, rocks, and shoals, which extend seaward for a distance of 4 cables. Near the entrance of Porto Terranova is Liscia delle Saline, and between it and the cape, Porto Vitello. Capo Ceraso has an islet at its foot, and rocks extend about 2 cables from the east of it. Monte Maladormida, 715 feet high, and the highest peak near the cape, has a beacon on its summit.

Secca Sperlatto, with a least depth of 3¼ feet, and of small extent, lies at the extreme of a bank of sand and rocks above water, which extends about 3½ cables from the shore, midway between Punta Ruja and Capo Ceraso.

The light of Isolotto Bocca is obscured over Punta Ruja and Secca Sperlatto, and the *irregular flash* shows for about 2 cables to the northward of them.

Mooring buoy.—A mooring buoy lies in the centre of the bay, eastward of Punta Ruja.

General charts 161b, 676, 2158a, 449.

Chart 163, Cape Ferro to Port Brandinchi, &c. Var. 9° 40′ W.

Beacon.—A 3-foot shoal, lying 3¾ cables eastward of Capo Ceraso, is marked by a masonry beacon, 13 feet in height. This beacon is unreliable.

Punta Coda Cavallo, 6 miles south-south-eastward of Capo Ceraso, is the termination of high, undulating land; Isola Proratora lies close to its north side, and is skirted with rocks. The intermediate land is high and broken, and the coast irregular, forming indentations and points fronted with several islets, rocks, and shoals. Isola Tavolara and Isola Molara lie about a mile from the shore, in the bight between Capo Ceraso and Punta Coda Cavallo.

From Capo Ceraso the coast trends, in a south-westerly direction, for a distance of 2 miles to Porto Sisco, a circular cove, in which the depths are from 1½ to 4 fathoms, with a sandy beach, but as it is exposed to the eastward, and there are rocks at its head, it is seldom visited.

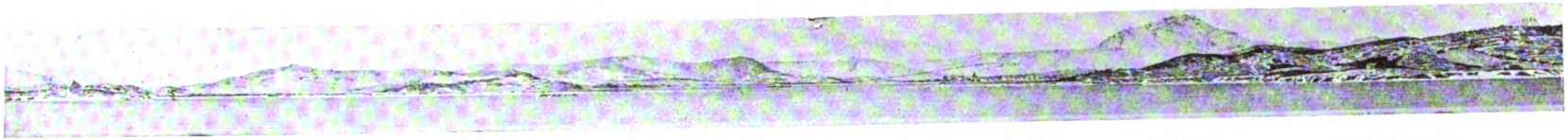
To the eastward of the cove, and 1¾ miles southward of Capo Ceraso, is Isola Cavalli, 49 feet above the sea, and nearly united with other smaller islets, lying between its south-west part and the coast; there is no passage between. At nearly half a mile westward of Isole Cavalli is a rocky shoal, with 1½ fathoms water over it, between which and Capo Ceraso the depths are from 7 to 12 fathoms. The bay between Capo Ceraso and Isola Cavalli is known as Golfo Sparlatta.

Porto San Paolo.—The above islets form with the coast an inlet on the south, about three-quarters of a mile in length and 4 cables in width, named Porto San Paolo. Its entrance is open to the eastward, but protected from the sea by Isola Tavolara, distant three-quarters of a mile. Coasters anchor in 2 fathoms water, but large vessels further out, southward of Isola Cavalli, in 5 or 6 fathoms. Near the shore of the inlet the water is shallow.

Isolotto Reulino (*Lat. 40° 53′ N., Long. 9° 40′ E.*), small, of a red colour, and 36 feet above the sea, lies a mile to the south-eastward of Cavalli, three-quarters of a mile from the coast of Sardinia, and rather more than half a mile from the west end of Tavolara. It is nearly joined to the coast by shallow water and rocks, which form the south side of the channel to Porto San Paolo. Vessels from the eastward should pass about 2 cables northward of the islet, or midway between it and the spit extending southward from the west point of Isola Tavolara. *See* view, page 663.

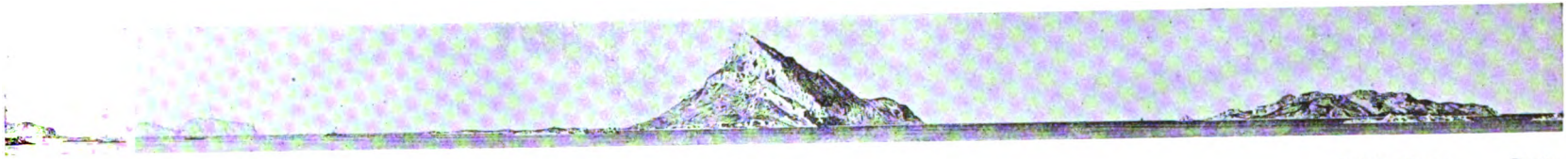
Porto Taverna.—Punta Pietra Bianca, so named from the colour of the land, is a mile southward of Isolotto Reulino, and between is the entrance to Porto Taverna. This port is a mile deep,

.e page 663.]



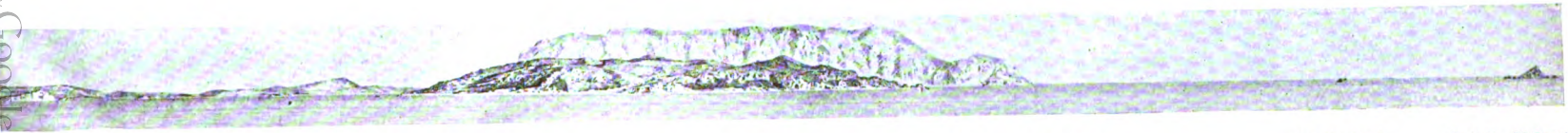
Terranova Campanile, bearing 271° true. *Monte Pino.* *Custom house.*

Entrance to Porto Terranova.



Capo Figari (distant). *Isolotto Reulino.* *Isola Tavolara.* *Isolotto Mezzo, bearing 86° true, distant half a mile.* *Punta Pietra Bianca.*

View from Porto Taverna.



Isolotto Proratora. *Isolotto Reulino.* *Monte Maladormida.* *Isola Molara.* *Tavolara lighthouse, bearing 353° true, distant 4½ miles.* *Scogli Cervi.* *Isolotto Molarotto.*

Channel between Sardinia and Tavolara and Molara.

Chart 163, Cape Ferro to Port Brandinchi, &c. Var. 9° 40′ W.

open to the northward, and sheltered by Isola Tavolara, the islet of Reulino, and its adjacent rocks and shoals. To the north-west of Punta Pietra Bianca, and close-to, is Isolotto Mezzo, surrounded by rocks, leaving a narrow boat passage between it and the point. *See* view facing page.

Anchorage.—The anchorage in 7 or 8 fathoms water, is sheltered from all winds but those from the E.N.E., which at times send in a considerable sea; small vessels anchor on the eastern shore to the south-west of Isolotto Mezzo, where they are more sheltered. A rock, about 40 yards in diameter, with a least depth on it of 23 feet, bears 253° true, distant 4 cables, from Isolotto Mezzo.

Isola Tavolara, 3¾ miles in length in an east-north-easterly and west-south-westerly direction, three-quarters of a mile in breadth, is high, arid, cliffy, and rugged, and nearly inaccessible on all sides, with its greatest elevation to the south-west, where it terminates in Monte Cannone, conical, and 1,847 feet high.

The south-western extremity is low, and terminates in a tongue of land surrounded by rocks and shallow water; the northern extremity of the shoal ground, with 2 fathoms over it, named Secca di Tavolara, lies 5½ cables northward of the south-western extremity of the island, and has 7 fathoms close to. Westward and southward of the same point the shoal ground extends from 3½ to 5½ cables; with these exceptions the island is steep-to.

Landing and casual shelter will be found in two coves, which terminate in a beach, one at either end of the island; that to the north-east, named Spalmatore di Fuori, is 4 cables deep, and about one wide, with 16 fathoms at the entrance to 4 fathoms within; the cove to the south-west, known as Spalmatore di Terra, affords shelter for small vessels in from 5 to 15 fathoms water, over weed and sand, but is exposed to the winds southward of east, and those from the eastern quarter cause a considerable sea on this part of the coast.

LIGHT (*Lat. 40° 55′ N., Long. 9° 44′ E.*).—On the north-east side of Isola Tavolara, and nearly midway between the entrance of Spalmatore di Fuori and Punta Papa, is a square yellow tower, 64 feet in height, with battlements, and rising from the centre of the keeper's dwelling, painted red and white in horizontal stripes; it exhibits, at an elevation of 538 feet above the sea, a *fixed* and *flashing white* light *every two minutes*, thus:—fixed, *eighty-six seconds;* partial eclipse, *fourteen and a half seconds;* flash, *five seconds;* partial eclipse, *fourteen and*

Isola Tavolara lighthouse.

General charts 161b, 676, 2158a, 449.

Chart 163, Cape Ferro to Port Brandinchi. Var. 9° 40′ W.

a half seconds; it is visible in clear weather from a distance of 27 miles. For arc of visibility, *see* Light list and chart.

Isola Molara, a mile to the south-east of Isola Tavolara, is 531 feet above the sea, 1½ miles in length in a west-north-westerly and east-south-easterly direction, and covered with brambles. A small islet, with several detached rocks, lies about 3 cables off its north-west end, and the north-western side of the island is foul. Off the north-east side of the island is Scoglio Porri, distant 2 cables from the shore. Between Isola Molara and Tavolara there are from 10 to 27 fathoms water, and the channel between Molara and Isolotto Proratora, on the north side of Punta Coda Cavallo, is about half a mile wide, with depths of from 13 to 15 fathoms, but it contracts somewhat to the westward, with the shoal water off Molara. (*See* view, page 663.)

Isolotto Molarotto (*Lat. 40° 52′ N., Long. 9° 47′ E.*), a conical rock about 65 feet above the sea, and situated 1$\frac{6}{10}$ miles eastward of Isola Molara, is of a red colour, bare of vegetation, and steep-to; the island is foul on the east side to the distance of a cable; and a sunken rock, having a depth of 11 feet over it, lies nearly 2 cables south-westward from the south-west side.

Scogli Cervi, a mile south-westward of Molarotto, are two rocks a little above water, standing at the south-east corner of a shoal and rocky plateaux, which extends from the islets a quarter of a mile in a northerly and a westerly direction.

Vessels may pass through the channel between Scogli Cervi and Isola Molara, but should avoid the channel between Scogli Cervi and Isolotto Molarotto, as, in addition to the shoals already mentioned, a dangerous shoal, having a depth of 2½ fathoms, lies north-eastward, distant a third of a mile from Scogli Cervi.

In passing between the foregoing islands and the main island, caution is requisite, as the currents in the different passages are uncertain, both in velocity and direction.

Porto Brandinchi lies about 1¾ miles south-westward of Punta Coda Cavallo, and the promontory affords shelter to vessels from northerly winds; it is about one mile deep, and nearly the same distance in width. The entrance is about 2 cables wide between Isola Rossa, on the north, and Testa di Moro, on the south; the latter is a pointed rock above water, so called from its shape and colour, which is the extreme of a ledge of rocks extending about a mile north-eastward from Punta Sabatino. Punta Brandinchi is a headland, 95 feet high, which divides the western part of the bay into two parts, both of which have white sandy beaches; the inner end of the headland is surrounded by marshes.

General charts 161b, 676, 2158a, 449.

Chart 163, Cape Ferro to Port Brandinchi. Var. 9° 40′ W.

Anchorage.—The anchorage is in 8 fathoms, about 4 cables westward of Isola Rossa. Coming from the northward, having rounded Punta Coda Cavallo, bring Scogli Cervi in line, astern, with the centre of Malarotto, bearing 44° true, until Testa di Moro is sighted ahead, which steer for until Isola Rossa is abeam, when steer for the northern extremity of the white beach southward of Punta Brandinchi, which course will lead to the anchorage passing 1¼ cables southward of Isola Rossa.

Chart 161b, Sardinia, northern portion.

Punta d'Ottiolo (*Lat. 40° 45′ N., Long. 9° 44′ E.*), 5½ miles southward of Punta Coda Cavallo, is rocky, and 3 miles north-northwestward of Punta d'Ottiolo is Punta Sabatino, the intermediate coast forming a bay, with a sandy beach 3 miles in length, within which is Lago San Teodoro. *See* view, page 666.

Anchorage.—There is anchorage for large vessels off San Teodoro beach, in from 11 to 15 fathoms water.

About a mile southward of Punta d'Ottiolo is Scoglio Petroso, not far from the shore, with reefs extending seaward above half a mile. At Punta Santa Anna, 2 miles further south, there is a conspicuous white patch on a low hill near the sea.

Punta and Scogli Pedrami.—About 1⅓ miles beyond Punta Santa Anna, and 4 miles from Punta d'Ottiolo, is Punta Pedrami, to the eastward of which a chain of islets, of the same name, a little above water, with a reef some distance further out, extend 1¼ miles from the shore. The passage within them is only suitable for boats.

The Fiume Posada runs into the sea 1½ miles southward of Punta Pedrami.

Punta Caletta lies 2½ miles southward of Punta Pedrami, and 2 miles further south is Punta Santa Lucia. Punta Caletta may be recognised by the white cylindrical tower of San Giovanni, northward of it, and by a group of houses southward of the tower. Santa Lucia has the ruins of a tower on its extremity, and may be recognised by a group of reddish coloured houses behind the tower; there is a long stretch of white sand standing out between the green bushes, which is especially conspicuous when seen from the northward.

Posada lies about 2 miles north-westward of Punta Caletta, and is situated along the steep sides of a small conical hill, on which is an old castle.

Siniscola, with a conspicuous steeple, lies about 4 miles westward of Punta Santa Lucia, and its loading place is in a small sandy creek northward of Torre Santa Lucia: it exports grain, fruit, honey, and cheese.

General charts 676, 2158a, 449.

Chart 161b, Sardinia, northern portion. Var. 9° 30′ W.

Anchorage.—There is anchorage southward of Punta Caletta, in from 6½ to 7 fathoms, with Torre San Giovani in line with Posada. The weekly steamer between Leghorn, Genoa, and Cagliari anchors here.

Capo Comino (*Lat. 40° 32′ N., Long. 9° 51′ E.*), the eastern extreme of Sardinia, is the termination of high undulating land which extends in a north-east direction. The cape is low, salient, and near it, on its north side, is the small islet of Rossa. From Punta d'Ottiolo the coast is low, with several lagoons, and is all along backed by elevated land; Punta Maggiore, 6 miles westward of Punta d'Ottiolo, is 3,182 feet above the sea. (*See* view facing page.) Monte Alvo, 14 miles westward of Capo Comino, terminates in tableland, is 3,701 feet above the sea, and from its whitish appearance is a good mark for this part of the coast. The town of Siniscola lies at the eastern foot of this range.

During strong westerly winds heavy squalls blow through the valleys and are felt some distance seaward.

Golfo di Orosei.—Golfo di Orosei is formed between Punta Nera (8½ miles to the southward of Capo Comino), and Capo di Monte Santo, which is distant from it 18 miles to the southward. With the exception of 4 miles of the north-west shore, it is bounded by perpendicular cliffs of considerable elevation, broken by small bights with pebbly beaches, where boats may find shelter with off-shore winds; among the crags are wild olive trees and stunted timber, and several small streams enter the sea.

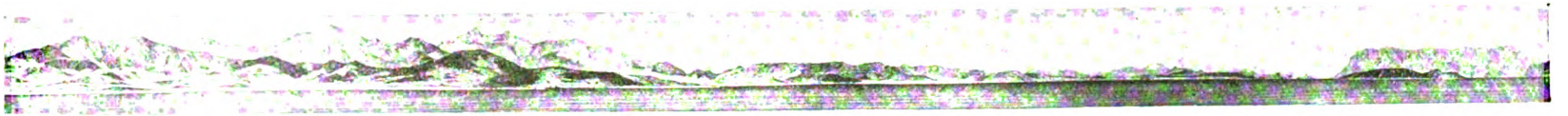
The rocks which lie off the cliffs do not extend any distance, and the gulf is without any other hidden danger: a mile from the shore, in the southern part of it, there are depths of 30 fathoms and upwards; it is less deep to the north; 1½ miles beyond a line joining the entrance points there are 527 fathoms water, over mud.

Orosei.—At 2½ miles west-south-westward from Punta Nera is the mouth of the Fiume Orosei, the outlet of many other hill streams; it runs into a salt lake, 2½ miles in length, and about a quarter of a mile in breadth, within the sandy shore; boats can navigate the river for some little distance. The town of Orosei, with 2,079 inhabitants, is on the right bank of the river, a mile from the coast, and upon elevations inland are some chapels and several villages.

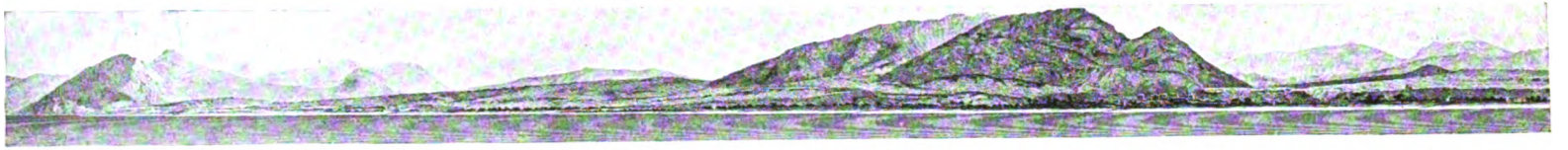
A castle stands on a hill on the same side of the river, about 3 miles inland, and Monte Tuttavista, south-westward of it, rises to an elevation of 2,641 feet above the sea. The country around is very fertile, but unhealthy during the hot season; vessels call for the productions of the province, consisting chiefly of corn and cheese. *See* view facing page.

General charts 676, 2158a, 449.

To face page 666.]



Punta Santa Anna, bearing 270° true, distant 6 miles. *Punta Maggiore (peak).* *Punta d'Ottiolo.* *Porto Brandinchi.* *Isola Molara. Isola Tavolara (behind).*



Monte Erveri. *Monte Tuttavista (behind).* *Orosei Campanile, bearing 299° true, distant $1\frac{7}{10}$ miles.* *Custom house.*

Lighthouse bearing 148° true, distant 8 cables. *Torre Arbatax.* *Torre San Gemiliano.*

Capo Bellavista.

Chart 161b, Sardinia, northern portion. Var. 9° 30′ W.

Communication.—The steamers running between Genoa, Leghorn, and Cagliari call here weekly, and also at Cala Gonone, 6 miles further south, which is the shipping port of Dorgali.

Coast. — Three and a half miles from Fiume Orosei, passing an uncultivated sandy coast, is a low point named Nera di Osalla, off which there are rocks; Cala Cartoi is upon the south side of the point, at the mouth of a stream, beyond which commences the range of cliffs before mentioned.

Capo di Monte Santo is a bold rugged promontory sloping from an elevation of 2,398 feet above the sea, and terminating in abrupt cliffs.

Charts 161a and 161b.

Golfo di Tortoli.—The coast bends towards the southward and westward from Capo di Monte Santo, and with Capo Bellavista, lying 10 miles to the southward, forms Golfo di Tortoli. Close off the shore, 4½ miles from Capo di Monte Santo, is Punta Guglia, a little to the north of which is a small bight, where a good supply of water can be procured. The tower and chapel of Santa Maria are on a point 2 miles southward of Punta Guglia; thence the shore of the gulf is low and sandy; two rivers flow into it, and there is a large lake, Lago di Tortoli, on the south-west side, which in winter is navigable for boats, supplying with fish the neighbouring villages of Girasol, Lazzorai, and Donigalla.

Isola Ogliastra (*Lat. 39° 58′ N., Long. 9° 42′ E.*), about a mile south-south-east from Torre Santa Maria, is a rugged mass of red rock, 160 feet above the sea, having several rocks around it both above and under water; there are, however, 9 fathoms water within a cable of the island, and a good passage between it and the shore. There is anchorage south-westward of the island, in 7 fathoms of water, about 2 cables from the shore. The *fixed red* sector of Porto di Tortoli mole light shows over the island.

Plan of Arbatax road on 1128.

Capo Bellavista, a promontory, forming the southern side of Golfo di Tortoli, is of porphyritic formation, and moderately elevated; the head is above a mile in breadth in a north and south direction, much indented, and bold, off the extreme eastern point. On the north end are the tower and chapel of Arbatax; on the south, the tower and chapel of San Gemiliano, and on the central elevation is a lighthouse. Off the cape there are depths of 14 to 16 fathoms at a third of a mile, outside of which the depths increase rapidly. *See* view page 666.

General charts 676, 2158a, 149.

Plan of Arbatax road on 1128. Var. 9° 30′ W.

LIGHT (*Lat. 39° 56′ N., Long. 9° 43′ E.*). — On the summit of Capo Bellavista is a square tower, 63 feet in height, with battlements, and surmounting a rectangular dwelling, the base of which is painted black and white in bands; it exhibits, at an elevation of 541 feet above the sea, an *occulting white* light *every fifteen seconds*, thus:—light, *ten seconds;* eclipse, *five seconds;* the light has an estimated visibility of 28 miles in clear weather.

Capo Bellavista lighthouse.

Porto di Tortoli (Rada di Arbatax).—The northern point of the cape forms a bay with a sandy beach, from which a good road runs into the interior, and whence the surplus produce of the district is shipped when the winds are favourable.

Port. — From the north-west side of the point a mole extends northward and north-westward, for a distance of 257 yards, thence westward for about 200 yards.

LIGHT.—From a turret, 20 feet high, erected on the head of the mole, is exhibited, at an elevation of 46 feet above the sea, an *occulting white* light, *every twenty-five seconds*, showing thus: — light, *twenty seconds;* eclipse, *five seconds;* it is visible in clear weather from a distance of 8 miles.

In the same turret, 33 feet above the sea, is exhibited a *fixed red* light, which shows a sector of 15° over Isola Ogliastra.

Tortoli, with a population of 2,105, is about 3 miles west of the cape, and has a large cathedral with a cupola. The country around is well cultivated, and produces a quantity of cheese, grain, fruits, tobacco, and wines.

Communication.—Steamers between Leghorn, Genoa, Maddalena, and Cagliari call weekly. A tramway between the port and Tortoli, and telegraphic communication.

Supplies.—Provisions may be procured at Tortoli; wood can be obtained in abundance by vessels visiting the Gulf of Tortoli, and water, in favourable weather, near the tower of Santa Maria.

Chart 161a, Sardinia, southern portion.

Coast. — Southward of Capo Bellavista is a bay with a sandy shore, into which flows the small Fiume Tortoli, and here coasting vessels find shelter from northerly winds. Punta Nera di Bari, which is low and rocky, is situated 5 miles south-south-westward of the cape, and 2 miles further in the same direction is Torre di Bari, 23 feet above the sea, off which are a few rocks. Cala Francese, 10 miles southward of Capo Bellavista, affords shelter for boats, and southward of it the

Chart 161a, Sardinia, southern portion. Var. 9° 30′ W.

coast is rocky. Along this shore there are no dangers beyond a third of a mile off; farther out the ground is uneven.

The country is undulating, and of moderate elevation; the higher land approaching the coast towards the south is covered with wood. Monte Gennargentu, 6,130 feet above the sea, and the highest mountain in Sardinia, is situated 19 miles westward of Capo Bellavista. The district of Ogliastra, included between Monte Santo and the Cuadazzoni range, and separated by a chain of mountains from the rest of the island, is rich in cultivation, and studded with some of the best villages in Sardinia.

Capo Sferra Cavallo.—This rugged headland, 3 miles southward of Cala Francese, is the termination of Monte Ferrau, composed of granite, and 2,877 feet above the sea, which, with Monte Cuadazzoni, trends in a north-western direction, and to the southward runs nearly parallel to the coast, at about 5 miles distant from it. Off the cape is a small islet, and the coast is fronted for at least 20 miles by cliffs of considerable height, at the foot of which rocks and foul ground extend for a distance of about 2 cables.

Three miles from the cape, on the fall of the cliff, is Torre di San Giovanni di Saralà, cylindrical, white, and 65 feet above the sea: an islet lies a short distance off it. Capo Palmeri is 5¾ miles farther south, and 2 miles beyond it, at the termination of the cliffs and spur from the Cuadazzoni range, is Torre Murtas.

Isola di Chirra (*Lat. 39° 32′ N., Long. 9° 40′ E.*), about 1½ miles southward of Torre Murtas, is a cluster of rocks or islets included within a circuit of three-quarters of a mile; they are from 30 to 40 feet above the sea, and bold close-to on all sides, except to the eastward, where a bank extends with a depth of 2 fathoms half a mile from the islets. They lie off the centre of a pebbly beach with a deep-water channel between. This beach extends from Torre Murtas to Capo San Lorenzo, on which is a tower, 3½ miles to the southward; into the bay run two streams. If navigating the channel between the islets and the coast vessels should keep nearer the islets. *See* view, page 671.

Fiume Flumendosa.—Small islets and rocks extend from this coast to a distance of half a mile, but at about a mile off there are depths of from 12 to 16 fathoms. A chain of peaked hills extend a short distance behind, sloping down upon the south to a lake, and a little beyond, to the Fiume Flumendosa, one of the largest streams in the island, and in the winter very rapid; it flows from the north-west through a mountainous district, and approaches the sea between the villages and fertile grounds of San Vito and Muravera on the south, and Villapuzzu on the north.

General charts 676, 2158a, 449.

Chart 161a, Sardinia, southern portion. Var. 9° 30′ W.

Muravera, the chief town of the district, is about 2½ miles from the sea, and one mile from the river. Porto Corallo (Cala di Torre Corallo), a small bight north of the river's mouth, is resorted to by the coasting trade for cheese, fruit, grain, &c., but it is only safe in the summer season; it may be recognised by, in addition to Torre Corallo, a whitish house in ruins on the top of a small conical hill, a short distance north-westward of the tower. On the coast, a little to the northward of the town, is a group of houses, and also a small stone pier, which, however, is covered at high tides. Muravera contains 3,054 inhabitants.

Communication.—Steamers between Genoa, Leghorn, Maddalena, and Cagliari, call off this port once a week.

Coast.—The country between the Fiume Flumendosa and Golfo di Cagliari, nearly devoid of habitation, is chiefly occupied by wandering shepherds.

There are several lakes, the largest of which, named Colostrai, upon the south side of Torre Saline, receives the Picocca and other streams, and having a communication with the sea, is known as Cala Strallus. Fish are plentiful in this lake, Cagliari market being supplied from it.

Torre Saline stands on a rocky promontory, and is 92 feet above the sea, but is not conspicuous, as the tower is the same colour as the rocks.

Capo Ferrato, a white rugged point, elevated about 70 or 80 feet above the sea, terminates Monte Ferru, a conical peak, on which is a tower. There is deep water close off it, at a mile distant there is a depth of 30 fathoms, and 3 miles eastward of the cape there is 375 fathoms. From Capo Ferrato the coast turns to the westward for about half a mile, forming Cala Pirastro, open and unsafe; thence the shore continues low and sandy, with small lagoons and brushwood for 6½ miles, to Punta dei Cappuccini, a rocky projection.

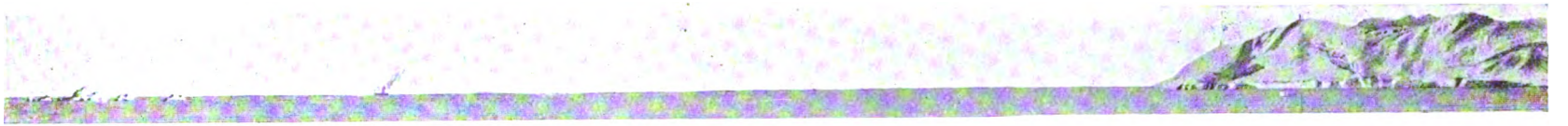
Scoglio di Sant' Elmo, small, about 3 feet above the sea, and situated about 1½ miles northward of Punta dei Cappuccini, and about half a mile from the shore, is bold all round, with 7 fathoms water between it and the shore.

Castiadas anchorage.—There is anchorage between Scoglio Sant' Elmo and Punta dei Cappuccini, about 6 cables from the latter, with a sandy bottom.

Wireless telegraph.—A wireless telegraph station is established at Castiadas; it is open to the public from sunrise to sunset; the call letters are I.C.C.

Isola Serpentara (*Lat. 39° 8′ N., Long. 9° 37′ E.*), about 2½ miles southward of Punta dei Cappuccini, consists of four islands,

General charts 165, 676, 2158a, 449.



Isola di Chirra, bearing 152° true, distant one mile.

Capo San Lorenzo.
Torre di Monte Rosso.

Isola Serpentara.
Torre San Luigi.

Carbonara lighthouse, bearing 213° true, distant $5\frac{1}{10}$ miles.

Punta dei Molenti.

Punta Porcelli.

Isola dei Cavoli lighthouse, bearing 221° true, distant $1\frac{8}{10}$ miles.

Torre Caterina.

Torre Giunco.
Secca dei Berni.

Torre di Capo Boi.

Chart 161a, Sardinia, southern portion. Var. 9° 30′ W.

the group extending above a mile in a north and south direction; the largest island is a mass of granite with steep sides, and has a tower named San Luigi upon its highest part, 177 feet above the sea. There is deep water all round, and depths of from 12 to 15 fathoms between the islets and the shore. *See* view facing page.

Punta dei Molenti, 2 miles westward of Isola Serpentara, is a small peninsula, little elevated, and joined to the main island by a low sandy isthmus; it is surrounded by rocks.

Anchorage may be taken up in the sound in from 15 to 16 fathoms water, over a bottom of gravel and weed; the best berths are half-way between Cala Piras and the northern islet, and the same distance between Punta dei Molenti and the south end of the large island. This latter is known as Rada Porcelli, from the group of rocks, Scogli-i-Porcelli, which extend south-eastward from the coast for a distance of about 2 cables.

Porto Giunco.—Between Punta dei Molenti and Capo Carbonara is Porto Giunco and Torre Giunco, over a steep cliff, 210 feet above the sea, is nearly a mile northward of Capo Carbonara.

Several rocks, both under and above water, lie off the shore between Capo Carbonara and Torre Giunco; the outer ones, named Il Barca or Boat rocks, are about 10 feet above the sea, and a quarter of a mile from the shore, with 4 to 5 fathoms water between.

Secca dei Berni are without the line of bay, and in nearly a central position; one of them awash bears 200° true, distant 1¼ miles from Punta dei Molenti. Nearly a cable north and south of the rock awash are two others, the first with 6 feet, the latter with only one foot water over it.

LIGHT (*Lat. 39° 7′ N., Long. 9° 33′ E.*).—A stone, cylindrical-shaped tower, with black and white bands, 18 feet in height, stands on the centre of the rocks, and exhibits, at an elevation of 39 feet above the sea, an unwatched *flashing white* light *every two and a half seconds*, thus:—flash, *half a second;* eclipse, *two seconds;* it is visible in clear weather from a distance of about 10 miles.

Anchorage.—There are depths of from 5 to 14 fathoms in Porto Giunco, at a reasonable distance from the shore, and good anchorage may be obtained about three-quarters of a mile east of the tower, in from 6 to 8 fathoms water, over sand and weed. This anchorage is sheltered from winds northward of N.E. round to South, but generally there is a heavy swell with winds from the opposite quarters.

SOUTH COAST.—Capo Carbonara.—This nearly isolated headland lies in a south-south-easterly direction, and terminates in a

Chart 161a, Sardinia, southern portion. Var. 9° 30′ W.

sharp cliffy point: three-quarters of a mile north-west of the extreme, on a steep pinnacle, is Torre Caterina, 381 feet above the sea, and on the north extreme point of the head, a small fort, Fortezza Vecchia. A quarter of a mile south-westward from the fort is Isolotto di San Stefano, 59 feet above the sea, and farther south, abreast the tower, a rock above water, the shore on this side of the cape being foul.

North-eastward of the extreme of Capo Carbonara, and a quarter of a mile from the shore, there is a rock with 8 feet water over it.

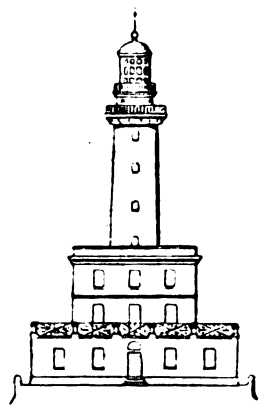
A sandy isthmus and lake separate Capo Carbonara from the rising ground within, the village of the same name lying in a hollow about a mile from the coast. Nearly 15 miles north are the seven peaks, named the Sette Fratelli or seven brothers, the highest of which is 3,333 feet above the sea; they form a good mark for strangers approaching this part of the coast.

Signal station. — Semaphore. — On Torre Caterina is a semaphore, 381 feet above the sea, with which vessels can communicate.

Isola dei Cavoli, lying a third of a mile south-eastward of Capo Carbonara, is about a mile and a half in circumference, and 144 feet above the sea: off the south-eastern point are several islets, and some rocks extend a quarter of a mile from the south-west point. On the east side is a rocky bight forming a good boat harbour, whence, should the wind blow on shore, small vessels can run for Cagliari. The island is of grey granite, covered with brushwood, and the formerly ruinous defensive tower is now a lighthouse.

Between the island and Capo Carbonara there are depths of 8 and 9 fathoms, and the water is deep around the island. *See* view, page 671.

LIGHT.—Carbonara (*Lat. 39° 5′ N., Long. 9° 32′ E.*).—On the north-east part of Isola Cavoli, a yellow circular tower, surmounting a yellow dwelling, the whole 123 feet in height, exhibits, at an elevation of 242 feet above the sea, a *fixed and flashing white* light *every thirty seconds*, showing a *flash* for *seven seconds;* it is visible in clear weather from a distance of 22 miles. For arc of visibility, *see* Light list.

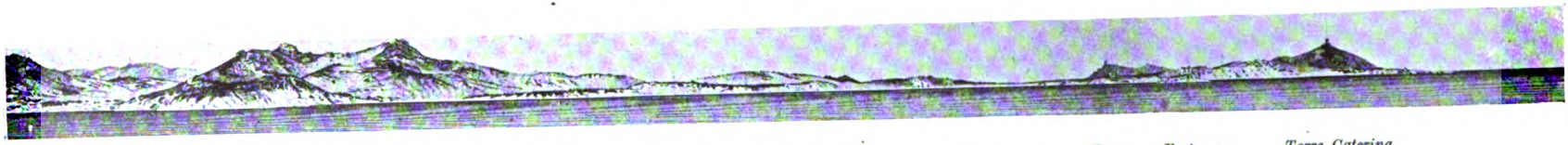


Carbonara lighthouse.

Telegraph station. — There is a telegraph station on Isola Cavoli.

Secca di Cala Caterina. — About 1½ miles west-south-westward from Capo Carbonara, the ground is uneven, with patches of 7, 6, and 2¾ fathoms, over a rocky bottom, surrounded by

General charts 165, 676, 2158a, 449.



Monte Bruncu de Sonnus. *Torre Giunco.* *Fortezza Vecchia.* *Torre Caterina, bearing 138° true, distant $1\frac{6}{16}$ miles.*

Baia Carbonara.

Torre Loi. *Torre San Pancrazio (Cagliari), bearing 9° true, distant $9\frac{1}{4}$ miles.* *Capo Sant' Elia.*

Golfo di Cagliari.

Torre Giunco in line with Isolotto di San Stefano. *Torre Caterina.* *Isola Cavoli lighthouse, bearing 106° true, distant about 8 miles.*

Chart 161a, Sardinia, southern portion. Var. 9° 30′ W.

depths of 20 fathoms a short distance off. The Fortezza Vecchia, well open to the east of Monte Bruncu de Sonnus (Bcu. Onnos), bearing about 25° true, leads westward of the rock; and Torre Finocchio, a little open to the northward of the extreme of Capo Boi, bearing 304° true, leads between the rock and the mainland.

Bell-buoy.—On the north-eastern edge of this rock, a black bell-buoy is moored. The buoy is surmounted by a conical tube, with black and white stripes, on the top of which is the bell, covered by a hood.

GOLFO DI CAGLIARI (ancient Caralitanus Sinus), the largest indentation on the south of Sardinia, lies between Capo Carbonara on the east and Capo di Pula on the west, which lies 24 miles from Capo Carbonara; the gulf is about 12 miles deep. Both sides of the gulf are a succession of rocky points and sandy bays; at the head is a broad sandy beach 11 miles across, broken by the rocky projection of Capo Sant' Elia, from which is exhibited a light. *See* view facing page.

A high range of hills slopes towards the shores on both sides; but from Cagliari an extensive plain crosses the island to Golfo di Oristano, 44 miles in a north-north-west direction; this plain is fertile and well cultivated. Several streams enter the gulf, those towards the south entering a large lake which communicates by several passages with the sea.

Depths off-shore.—At a distance of 3 miles from the eastern shore of the gulf, the soundings vary from 180 to 300 fathoms, but along the west side, and at 4 miles from the head, on both sides of Capo Sant' Elia, the water becomes shallow, decreasing gradually from 26 and 30 fathoms, with some uneven ground south-west from the cape.

Baia Carbonara (*Lat. 39° 6′ N., Long. 9° 30′ E.*) (*see* view facing page).—Cape Boi, 390 feet above the sea, lies 4⅓ miles north-westward from Capo Carbonara, and between them is Baia di Carbonara, about 1¾ miles deep; its north-eastern side is foul within a distance of a quarter of a mile. Isolotti Pescatelli, in the western part of the bay, are situated 1½ cables from the rocky cliffs northward of it, and Secca Pescatelli, a group with 11 feet least water over it, lies nearly half a mile south-west of it, with a channel of 8 fathoms between; 10 fathoms will be found at a distance of 2 cables south of the rock.

Torre Giunco well open to the southward of Isolotto di San Stefano, bearing 90° true, leads to the southward of Secca Pescatelli. *See* view facing page.

Communication.—The steamers between Genoa, Leghorn, Maddalena, and Cagliari, call here every week, but with south-west winds they anchor at Porto Giunco.

General charts 165, 676, 2158a, 449.

Chart 161a, Sardinia, southern portion. Var. 9° 30′ W.

Anchorage may be obtained in 11 fathoms water, about 8 cables west-north-westward of Fortezza Vecchia, or in a depth of 8 fathoms, half a mile north-westward of the same: a rock, with one foot of water over it, lies 3¾ cables north of the fort.

Coast. — From Capo Boi, as far as Cala Regina, the coast has alternate cliffy points and sandy bays; midway is Torre Finocchio, 285 feet above the sea. Torre di Mortorio is situated on a low, rocky point, whence a level coast trends in a west-north-westerly direction for 4 miles, to the north-eastern point of Baia di Quartu, on which is Torre Foxi, 10 feet; and on the point, 1⅓ miles eastward of Torre Foxi, is Torre San Andrea, 16 feet above the sea, and named after a chapel a little northward of it. The coast may be boldly approached until nearing this last-named tower, off which a shoal, a spit of rock and sand, extends for a distance of nearly half a mile, with 5 fathoms a little outside.

Baia di Quartu (*Lat. 39° 13′ N., Long. 9° 13′ E.*) is formed between the point on which is Torre Foxi and Capo Sant' Elia, a distance of 4¼ miles in a west-south-westerly direction; the shore is a fine sandy beach, commanded by a fort upon the east, and on the shore and north projection of the cape, are several round towers. The country within to the surrounding villages, a distance of 3 miles, is nearly all occupied by lakes and salt marshes, but beyond is a fertile undulating country, named Il Campidano di Cagliari, which produces some of the finest fruits of the island. The village of Quartu Santa Elena, 1½ miles within the north shore, has a population of 8,510, and its white cathedral, with a cupola and reddish roof, is conspicuous.

The bay has a moderate depth of water, but it is too exposed to be recommended as an anchorage, neither is the holding ground good.

A shoal, with 4¼ fathoms water over it, lies just southward of an imaginary line joining Torre Foxi and the south extreme of Capo Sant' Elia, and nearly midway between them.

Plan 1130, Cagliari bay. Var. 9° 40′ W.

Capo Sant' Elia, which separates Baia di Quartu from that of Cagliari, is a limestone head, about a mile in extent, with Torre Sant' Elia, 446 feet above the sea on its eastern side, and low land north of it; it appears isolated, and is broken into several cliffy points, on which, to the extreme north-east, is Torre Poetta. On the northern part of the cape is Forte di San Ignazio: and San Bartolomeo chapel lies at the foot of the northern slope. *See* view, page 678.

General charts 165, 676, 2158a, 449.

No. 251.—Scaffa Bank Light-Buoy—Alteration in Character of Light.

Position.—Off the south-eastern side of Scaffa bank.
Lat. 39° 11¾′ N., long. 9° 06¼′ E.

Alteration.—The character of the light on this light-buoy has been altered from fixed red to *flashing red every two seconds*, thus:—

Flash,	eclipse.
½ sec.	1½ secs.

Chart No. 1130. Med. 1, p. 675.

No. 490.—Cape San Elia Light—Alteration in character.

Position.—On the point about $4\frac{1}{2}$ cables, southward of Fort San Ignazio. Lat. 39° 11′ N., long. 9° $08\frac{3}{4}$′ E.

Alteration.—The character of the light has been altered from alternating fixed and flashing write and red to *group flashing white* showing *two* flashes *every eighteen seconds*, thus:—

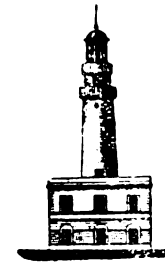
Flash,	eclipse,	flash,	eclipse.
$\frac{9}{10}$ sec.	$5\frac{1}{10}$ secs.	$\frac{9}{10}$ sec.	$11\frac{1}{10}$ secs.

Caution.—See Notice to Mariners No. 322 of 1916, with reference to the extinction of Italian lights.

Chart No. 1130. Med. 1, p. 675.

Plan 1130, Cagliari bay. Var. 9° 40′ W.

LIGHT (*Lat. 39° 11′ N., Long. 9° 9′ E.*).—On a point 4½ cables south of Forte di San Ignazio, a yellow circular tower, surmounting a yellow dwelling, the whole 78 feet in height, exhibits, at an elevation of 239 feet above the sea, an *alternating fixed white* and *flashing red* light *every one minute*, thus:—*fixed white, twenty seconds;* partial eclipse, *sixteen and a half seconds; red* flash, *seven seconds;* partial eclipse, *sixteen and a half seconds;* it is visible in clear weather from a distance of 18 miles.



Capo Sant' Elia lighthouse.

Signal station.—Semaphore.—On Torre di Cala Mosca, near the lighthouse, is a semaphore station, with which vessels can communicate: it is 230 feet above the sea, and painted black and white.

Rada di Cagliari lies between Capo Sant' Elia and La Maddalena, and is a safe and convenient roadstead for vessels in all weathers: in summer, and in calm weather in winter, vessels here discharge and embark cargo with comparative facility; in the winter months especially it is much frequented by vessels of war and merchantmen for shelter and repair, as also for provisions and water.

Rocks and shoals.—Close round Capo Sant' Elia there are depths of 4 and 5 fathoms. A small rock above water, named Scoglio Perdaliada, lies a cable off the shore westward of the lighthouse. A shoal of 4¾ fathoms, lies 245° true, distant 1¼ miles, from Sant' Elia lighthouse, and another shoal of the same depth lies a quarter of a mile to the north-west. A shoal flat fringes the whole of the shores of Rada di Cagliari; off the eastern shore, and abreast the town, the 3-fathom line is found at nearly half a mile distant.

Secca della Scaffa, about half a mile in length in a north-north-east and south-south-west direction, and with 2½ fathoms water over it, lies 3 cables south-west of the entrance to the port.

Light-buoy.—A black conical buoy, exhibiting a *fixed red* light, is moored, in 5¼ fathoms, on the south-eastern side of Secca della Scaffa.

Buoys.—Secca della Scaffa is also marked on its north-eastern and eastern edge by a black conical buoy, surmounted by a black cylinder.

Anchorage.—The usual anchorage is about 4 cables southward of the entrance to the port, in 6½ fathoms, with Sant' Elia lighthouse bearing 122° true, or further out, in 10 fathoms, with the lighthouse bearing 97° true.

The shore between Capo Sant' Elia and Cagliari is a shallow bight,

General charts 161a, 165, 676, 2158a, 449.

Plan 1130, Cagliari bay. Var. 9° 40′ W.

partly occupied by salines; into it is drained the surplus water from the lakes, and fronting it are many banks about level with the water.

The western shore of Rada di Cagliari is composed of a narrow strip of sandy beach named the Playa, which extends in a south-westerly direction for 5½ miles, to La Maddalena; within this is Lago di Cagliari, of about 5 miles in length, and of salt water, which communicates with the sea through eight bridged passages; near that next to the city is Torre Scaffa, and upon the ridge are several salinas.

This lake is shallow, has upon it several flat islands (on the largest of which is San Simone chapel), and receives at its northern extremity the Fiumi Mannu (from the north-east), the Samassi (from the north), and Sixerri (from the westward); it abounds in fish, such as the mullet, eel, &c., also in water-fowl, and is navigated by flat-bottomed boats.

Plan of Cagliari harbour on 1130.

Port. — The harbour is formed by two moles, the eastern of which, named Nuovo Molo, extends from the eastern side of the city first south-westward for a distance of 208 yards, then westward 216 yards; and turning west-north-westward for a remaining distance of 205 yards to its head.

The western mole, Molo Ponente, from the west side of the city, extends south-south-eastward for a distance of nearly 2 cables, leaving an entrance between it and the head of Nuovo Molo, about 320 yards in width. Two quays extend about 180 yards from the north-east side of the port, the railway running on to each.

The eastern of these quays is named Molo Sant' Elmo, and immediately east of it is La Darsena or inner harbour, and here is the custom-house and the Port office.

Depths.—In the entrance to the port there is a depth of 24 to 26 feet; inside the depths are generally from 21 to 27 feet; in the entrance to La Darsena 24 feet; and in La Darsena from 12 to 24 feet.

LIGHTS (*Lat. 39° 13′ N., Long. 9° 7′ E.*). — **Nuovo Molo.**— On the outer head, an iron support on a shed exhibits, at an elevation of 28 feet above the sea, an *occulting green* light *every five seconds*, thus:—light, *three and a half seconds;* eclipse, *one and a half seconds;* it is visible in clear weather from a distance of 7 miles.

Molo Ponente.—A *fixed red* light is shown from an iron standard 10 feet in height, on the extremity of Molo Ponente, at an elevation of 23 feet above the sea; it is visible in clear weather from a distance of 2 miles.

General charts 161a, 165, 676, 2158a, 449.

Plan of Cagliari harbour on 1130. Var. 9° 40′ W.

La Darsena.—At the extremity of the south mole of La Darsena a *fixed green* light is shown, at an elevation of 16 feet above the sea, from an iron column 11 feet in height; in clear weather it is visible from a distance of 2 miles.

A grey turret of masonry, 19 feet in height, on the extremity of the north mole of La Darsena (Molo Sant' Elmo), exhibits, at an elevation of 23 feet above the sea, a *fixed red* light, which is visible in clear weather from a distance of 2 miles.

Two fixed white lights, vertically, 3 feet apart, are shown at an elevation of 19 feet above the sea, from an iron standard, 17 feet in height, situated at the north-east corner of La Darsena, and are visible in clear weather from a distance of 2 miles.

Mooring buoys. — There are three grey cylindrical mooring buoys in the harbour.

Pilots can be obtained.

The following is the rate of pilotage: —

1. For every vessel conducted to the roads, or from the roads piloted outside up to 3 miles, 5 centisimi for every ton, net measurement.

2. For every vessel conducted from the roads to the basin or other point of the port, 6 centisimi for every ton, net measurement.

3. For every vessel taken in the 3 miles and conducted direct to port or basin, and vice versa, 9 centisimi for every ton, net measurement.

4. For every movement inside the port, 5 centisimi for every ton, net measurement.

The charge for each operation, whatever the tonnage of the vessel piloted, will not be less than 20 lire nor more than 100 lire.

Cagliari (*Lat. 39° 13′ N., Long. 9° 7′ E.*) (Caralis of the Phœnicians), the capital of Sardinia, lies at the head of the gulf, 2½ miles north-north-westward of Capo Sant' Elia; the central and original portion of the city is walled, with strong towers of Pisan structure, and the summit, elevated about 400 feet above the sea, is crowned by the citadel. Other defensive works comprise Castello di San Michele, upon a northern elevation of 524 feet; Forte Russo, on a height to the eastward, and a fort near the lake to the westward.

Without the walls on the western side is the mercantile and industrial quarter of Stampace, and below it, La Marina, which is chiefly occupied by the maritime community, foreign consuls, &c. On the east is Villa Nuova, with many detached houses and gardens, and an agricultural population.

Cagliari is the seat of a royal court, and tribunal of commerce; it is the residence of the military commandant of the island and of the

Plan of Cagliari harbour on 1130. Var. 9° 40′ W.

archbishop primate. Within the walls are the palace, cathedral, university, hospital, museum, and other public institutions; there are also numerous churches and convents. From the sea the city has an imposing appearance, from its commanding position, its many and varied towers and domes, the cathedral's being a conspicuous one, enlivened by the foliage of the palm and other trees; but the streets are steep and narrow, ill-paved, and the way broken by arched passages and steps. The population in 1911 was 61,013. A British Consul is resident. *See* view facing page.

Communication.—There are weekly steamers to Aranci, Leghorn, Genoa, Naples, Palermo, and Tunis; fortnightly steamer to Porto Torres. Railway communication with Porto Vesme, Tortoli, Cristano, Bosa, Nuovo, Porto Torres, Terranova, and Aranci; telegraphic communication with all parts. The telegraph office is always open. There is a wireless telegraph station at Castiadas (*see* page 670). There is a good road from Cagliari to the north end of the island, on which regular conveyances run. A steam tram runs to Santa Elena Quartu.

Coal and supplies. — About 1,500 tons of coal are kept in stock, and coaling is carried on by baskets. There are 3 or 4 barges or lighters, holding 35 to 40 tons, and from 200 to 300 tons could be put on board in 24 hours; but if steamboats are used to tow the lighters a much larger quantity. The coal wharf is 1,000 feet in length, and has a depth of 24 feet alongside at low water. Southerly winds may prevent or impede coaling.

Supplies of fresh meat, vegetables, and bread may be procured, and the water, which may be obtained near the quay, and from tank-vessels, is good and plentiful.

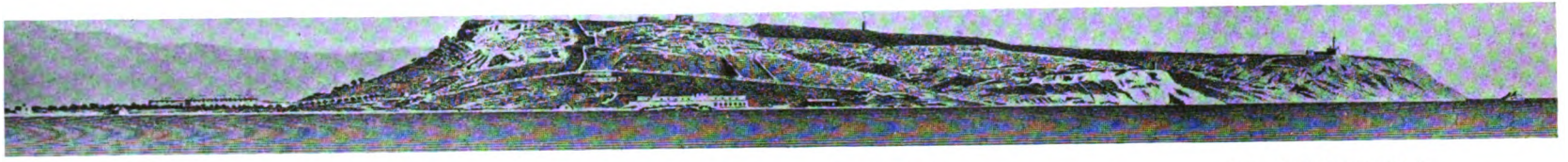
Repairs. — Small repairs to torpedo boats and gun vessels are executed here; there is a hand crane, which will lift 10 tons, near the head of Molo Sant' Elmo.

Hospital.—At the civil hospital sailors of all nations are boarded at fixed rates of payment.

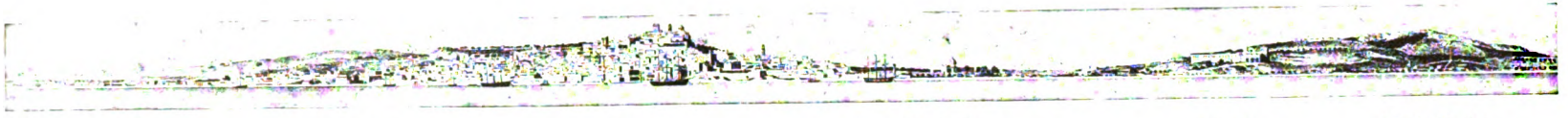
Trade. — The chief exports from Cagliari are wines, salt, cheese, cattle, skins, dried fish, wheat, charcoal, iron, zinc, and lead ores. The imports consist of wines and spirits, colonial produce, soap, cotton and silk goods, raw iron, coals, hardware, earthenware, and glass.

Winds. — The land winds are the most frequent and violent, especially those from the north and north-west, which predominate nearly two-thirds of the year; it is said the winds from seaward never blow home. *See* also Meteorological table, Appendix III.

General charts 161a, 165, 676, 2158a, 449.



San Bartolomeo. *Forte di San Ignazio. Lazaretto.* *Torre Sant' Elia.* *Capo Sant' Elia lighthouse; bearing 106° true, distant $1\frac{8}{10}$ miles.*



Railway station. *San Pancrazio, bearing 9° true.* *San Lucifero.* *Bonaria.* *Monte Urpino.*

Views from Rada di Cagliari.

Chart 161a, Sardinia, southern portion. Var. 9° 40′ W.

Coast.—La Maddalena, situated near the south end of the sandy ridge outside Lago Cagliari, is a shipping place for iron; there is a pier and a short line of rail connecting it with the mines near Assemini. Punta Savorra, on which there is a tower, 23 feet above the sea, is 6 miles southward of La Maddalena. About midway is Torre Antigori, in ruins, and about half a mile northward of Torre Antigori, on the shore, is a dynamite factory, a group of reddish houses with two tall chimneys, and very conspicuous from seaward; there is also a small pier with iron framework.

From Punta Savora to Capo di Pula, a distance of 4½ miles, the intermediate coast is broken into cliffy points and long sandy bays.

Isola di San Macario, 3 miles southward of Punta Savora, is on the extremity of a shoal which extends nearly 4 cables from the coast; on its northern part is a tower, 102 feet above the sea. The village of Pula, with about 1,780 inhabitants, is about a mile from the coast, abreast the island.

Water can be procured in any quantity from the mouth of the Manu, which will be seen in the bay within the island; other supplies can be procured from the village at short notice.

Anchorage.—Vessels requiring water, or shelter from westerly winds, may obtain anchorage in the small bay northward of Capo di Pula, in depths of from 7 to 8 fathoms, three-quarters of a mile off-shore.

Capo di Pula is a black conical crag with a rock lying off it; on its summit is a tower, 115 feet above the sea, and on the low sandy spit connecting it with the main island, is San Effisio chapel, and many ruins are scattered around. Porto di Pula (a well-sheltered boat harbour) is formed on the west side, between the cape and a rocky head, three-quarters of a mile apart. The shore of the port is broken by marsh islets and salt lakes, but there are extensive evidences of its ancient importance, when (as the Roman city of Nora) it possessed its mole, theatre, baths, aqueduct, &c.

Coast.—From the western point of Porto di Pula, a nearly straight coast trends 7½ miles in a south-west direction to Isolotto di Chia, westward of which, on a headland, is a tower; the coast, until within 1½ miles of the latter, is chiefly a gravelly beach, bold in approach, and backed by elevated ground. Approaching Isolotto di Chia, the high ground nears the coast, terminating in bold steep cliffs, off which, but close in, are a few rocky heads.

Chia (*Lat. 38° 54′ N., Long. 8° 53′ E.*).—Between Isolotto di Chia and Torre Chia, is the mouth of Fiume Chia, flowing from the northward through a pretty valley, near the village of Domus de

Chart 161a, Sardinia, southern portion. Var. 9° 40′ W.

Maria, and also near the smaller village of Chia. Within the sandy coastline are two lagoons, and the small island of Giudeo lies off the shore a third of a mile from Capo Spartivento.

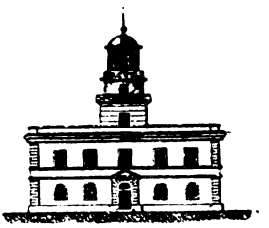
Water.—Near Torre Chia is one of the best watering places of the island.

Anchorage.—Off the coast abreast of Cala di Ostia and Cala di Chia are good anchorages with shelter from north-west winds; it is easy to get under weigh from either should the wind shift on-shore.

Capo Spartivento (ancient Herculis Prom) has a low cliffy front with a few rocks outside its west point; in a northern direction the land is high, Punta Severa, a peak 11 miles distant, being 3,215 feet above the sea. A rock, with 12 feet water over it, lies 180° true, one-sixth of a mile from the cape, with depths of 5 and 7 fathoms inshore; and Secca di Giudeo, on which the depth is 6 fathoms, lies 1¼ miles eastward of the lighthouse, and the same distance south-westward from Torre Chia. (*See* view facing page.) The bottom is generally rocky, but the water is deep around, and the coast otherwise bold.

The tower on Capo di Pula well open of the intervening coast, bearing about 43° true, leads to the southward of the 12-foot rock. *See* view facing page.

LIGHT (*Lat. 38° 53′ N., Long. 8° 51′ E.*).—A red circular tower, with a square base, and surmounting a red dwelling, the whole 64 feet in height, situated on the western part of Capo Spartivento, exhibits a *fixed white* light at an elevation of 267 feet above the sea, which is visible in clear weather from a distance of 20 miles. For arc of visibility, *see* Light list.



Capo Spartivento light-house.

Signal station.—Semaphore.—Upon Capo Spartivento is a semaphore, 682 feet above the sea, with which vessels can communicate.

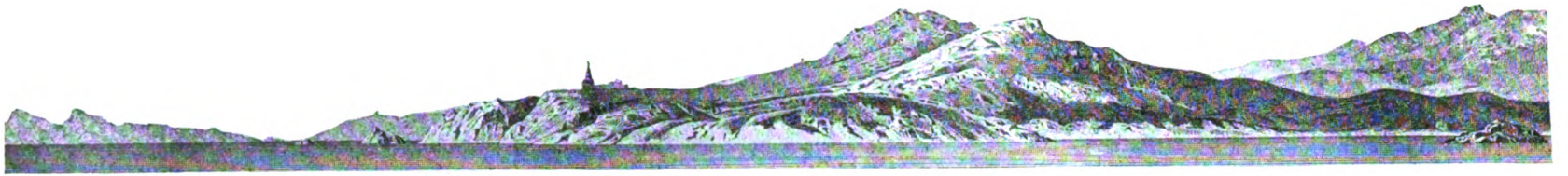
Storm signals are also shown from the station. *See* page 69.

Plan of Port Malfatano on 1129.

Porto Malfatano.—Nearly 3 miles west-north-west from Capo Spartivento, is Torre Malfatano, 220 feet above the sea, on the east side of which are two bights. Several islets border the coast, those named Ferraglione (Padiglioni), lying 1½ miles from Spartivento, are close in and bold-to; from them an indented shore turns to the northward for half a mile, curves to the westward a short distance within Isola Teredda (Tuaredda) (102 feet), then resumes the same northern direction to a deep bight which is very shallow at its head.

General charts 165, 676, 2158a, 449.

To face page 680.]

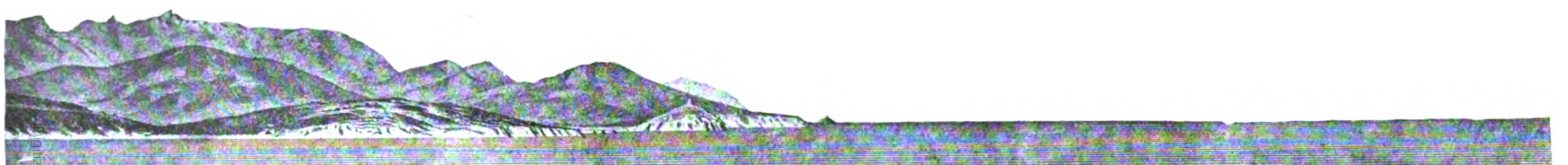


Capo Teulada.

Scoglio Padiglione in line with Torre Cala Piombo.

Capo Spartivento lighthouse, bearing 282° true, distant $1\frac{9}{10}$ miles.

Scoglio Giudeo.



Capo Spartivento.

Torre Chia, bearing 44° true, distant $3\frac{1}{10}$ miles.

Capo di Pula.

Il Toro.

Capo Teulada, bearing 282° true, distant about 5 miles.

Torre di Cala Piombo.

Cala Brigantina.

Porto Scuso.

Monte Lapanu.

Isola Rossa.

Torre del Budello.

Baia dell' Isola Rossa.

Plan of Port Malfatano on 1129. Var. 9° 40′ W.

This indentation, bounded on the west by the long narrow neck of Capo Malfatano, has an entrance a third of a mile in width, with depths of from 4 to 6 fathoms, but shoaling to 2 or 3 feet a third of a mile within it. Except at the head of this port, where the shore is flat with a lake beyond, the land is tolerably high; the country around is barren, and has a deserted appearance.

The port is open to the south-east, but coasting vessels lie here when bound to the southward and westward with contrary winds.

Close off Capo Malfatano is a sunken rock, but 5-fathom contour line encloses it within a less distance than a cable from the shore, which continues generally steep to the northward.

Chart 161a, Sardinia, southern portion.

BAIA DELL' ISOLA ROSSA, formed between Capo Malfatano and Capo Teulada, is 7¼ miles broad at the entrance, and 3¾ miles deep to Porto Teulada, which lies at the head, and at nearly equal distances from the two capes. The shores are, with one exception (upon the west side) free from danger, and are chiefly bounded by bold cliffs, with an elevated barren background. Depths of from 40 to 50 fathoms will be found within half a mile of both capes, and across the bay, gradually shoaling to 10 fathoms at about a quarter of a mile from the shore. *See* view, page 680.

The eastern shore of the bay trends in with an irregular curve, for 4¾ miles, in a north-west direction, to Porto Teulada; 1½ miles from Capo Malfatano is Torre Pixini, 49 feet, and beyond it, on the opposite side of a bight with a stony beach, Isolotto Campiona, 69 feet above the sea. The western shore of the bay is much indented.

Plan of Port Teulada on 106.

Porto Teulada (*Lat. 38° 56′ N., Long. 8° 43′ E.*) is an inlet of a quarter of a mile in extent, at the head of which are salt lakes, which receive the waters of two small streams from the hills. At the entrance there is a depth of 5 fathoms, but towards the beach it shallows rapidly; the port is open to the southward, but is frequented by the flat-bottomed boats of the country: Torre del Budello, 75 feet above the sea, stands on the western entrance point.

Punta Nera lies 6 cables southward of Torre del Budello. There is shoal water nearly a cable southward of Punta Nera, and a detached shoal, with a least depth of 3¼ fathoms over it, lies 3½ cables north-eastward of the same point.

The village of Teulada, with a population of 3,325, and not visible from seaward, lies about 3 miles to the north-east, and nearer, but in a northerly direction, are the chapels of Santa Lucia and San Isidoro.

General charts 165, 676, 2158a, 449.

Plan of Port Teulada on 106. Var. 9° 40′ W.

Isola Rossa.—About a mile to the southward of Porto Teulada, and a third of that distance from the western entrance point, is Isola Rossa, about a quarter of a mile in length, the same in breadth, and 177 feet above the sea at its north-east point, with a shoal extending a cable northward from its north-west end. It derives its name from the red appearance. In the channel between the island and the shore there are depths of from 5 to 8 fathoms.

Anchorage.—There is anchorage, sheltered from all winds except those from south-east to south-west, in 10 fathoms, hard sand, about midway between Punta Nera and Isola Rossa, but the north-west squalls here are very heavy. The island and anchorage are much resorted to by small vessels during the fishing season.

Plan of Piombo and Grotta bays on 1129.

Porto Scuro, an indentation 2 miles to the westward of Isola Rossa, is about half a mile deep, open to the south-east, and shoals from 12 fathoms at the entrance to 1½ fathoms at the head. Torre di Porto Scuro is situated on the cliffy point which separates Porto Scuro from Cala Brigantina.

Secca di Porto Scuro, the only hidden danger in Baia dell' Isola Rossa, is a small rocky shoal with 9 feet water over it, lying 68° true, distant 1$\frac{2}{10}$ miles from Torre di Porto Scuro, and a third of that distance from the shore, a shoal, with 2½ fathoms water over it, lies 1¼ cables northward of Secca di Porto Scuro.

The northern of two high peaks (over the eastern side of the bay) in line with the inner side of Isola Rossa leads eastward of the rock.

Cala Brigantina, about one mile southward of Porto Scuro, is about 6 cables wide, and the same distance deep; it has depths of 6½ to 10 fathoms, and shoals about 2 cables from the head.

Water.—There is a small well of water at the head of Porto Scuro.

Anchorage.—Baia dell' Isola Rossa is only recommended as a temporary anchorage, during north-west winds, for sailing vessels unable to fetch Golfo di Palmas, and not wishing to run back to Cagliari.

Capo Teulada (*Lat. 38° 52′ N., Long. 8° 39′ E.*) (ancient Chersonesus), a singularly formed headland, and the most southern point of the island of Sardinia, is about a mile in extent north and south, and nearly the same east and west, the southern face being the most elevated, and falling in steep cliffs 756 feet above the sea. *See* view on plan.

It is very irregular in outline both over the surface and round the coast, and slopes down to a sandy isthmus, about 100 yards across,

General charts 165, 2158a, 449.

Plan of Piombo and Grotta bays on 1129. Var. 9° 50′ W.

connecting it with the mainland of Sardinia, and separating Cala Piombo on the west and Cala Brigantina on the east.

Cala Piombo.—Two miles to the northward of Capo Teulada is the bluff peak of Piombo, upon which, at an elevation of 633 feet above the sea, is a tower; between is a bight, Cala Piombo, 1½ miles deep, in a north-easterly direction, towards the sandy isthmus before mentioned, bold to the shores. Cala Aligosta is a small bight close northward of Capo Teulada; vessels may anchor in these bights with winds from the northward round to south-eastward.

Plan 106, Palmas bay.

WEST COAST.—Golfo di Palmas.—This deep indentation, affording safe and convenient anchorage for every class of vessel, is formed between Capo Teulada and the coast northward, on the east, and the island of Sant' Antioco (of which Capo Sperone is the southern point), on the west, which is distant 11¾ miles from Capo Teulada.

The bay is about 8 miles deep, the eastern side forming two large bights and several smaller indentations; the western side is straighter, and about 6½ miles in length; the hills are low on either side, and the broad head of the bay is an extensive plain, broken by lakes and salt marshes. Except the small rocks lying a little within the entrance points, there are no hidden dangers, and the shores may be boldly approached to within 1½ miles, where the depth is 5 fathoms, gradually increasing to about 30 fathoms at the entrance of the bay. *See* view, page 685.

Secca di Cala Piombo, about 6 cables north-westward of Punta Piombo, is of small extent, and has about one fathom water over it; there is 13 fathoms water in the channel eastward, and deep water close outside.

Porto Pino.—Nearly 4 miles northward of Punta Piombo is Punta Zari, steep and cliffy, with a curved coast between, the southern part of which is broken into rocky points with several detached rocks lying about a quarter of a mile off; the northern part is a long, narrow, sandy beach fronting salt lakes of considerable extent. The entrance to the lakes, adapted for boats, is a roughly-formed canal a little east of Punta Zari, and under the name of Porto Pino is much frequented during the fishing season. The best anchorage is in from 6 to 7 fathoms, about half a mile eastward of Punta Zari, with Torre di Cala Piombo bearing 164° true.

Porto Botte (*Lat. 39° 2′ N., Long. 8° 34′ E.*).—A steep rocky coast continues northward for 3½ miles, to Punta di Porto Botte, and

Plan 106, Palmas bay. Var. 9° 50′ W.

is bordered by a ridge of hills about 130 feet above the sea; from this point the shores are flat and sandy, for 2 miles, curving inwards, and forming, at the northern end, a secure harbour for small vessels, named Porto Botte: the land a little within the beach is occupied by a large salt lake, between which and the hills beyond, is the cultivated plain of Sulcis.

Upon the outskirts are a few villages, and Torre Palmas is 2¾ miles northward of Punta di Porto Botte, and one mile from the port, from which there is a road leading to the town of Iglesias, 16 miles distant.

Coast. — Fiume Palmas, flowing from the eastern mountains, enters the bay nearly a mile north-westward of Punta Lana, which is the western point of Porto Botte, and from this the head of the gulf, composed of marsh and lakes, with sandy islets, upon which are a few fishers' huts, bends round for nearly 4 miles to a fort situated on the point of a narrow causeway, which is separated by a boat passage from the island of Sant' Antioco: this channel is crossed by a rude stone bridge, 300 feet in length, and said to have been built by the Romans. *See* view, page 685.

Sant'Antioco (ancient Sulci), a large village with 4,052 inhabitants, is situated nearly a mile north-north-westward of the fort; the principal industry is vine culture. There is a church at Sant' Antioco, and a castle of old irregular construction on the hill near it, elevated nearly 200 feet above the sea.

Un Canale (*Lat. 39° 3′ N., Long. 8° 30′ E.*).—A boat channel with about 8 feet water, and marked by stakes, extends 2¼ cables south-south-eastward of the bridge. With north-westerly winds a very violent current is experienced in the boat channel.

Anchorage may be obtained in 5 fathoms water, over weeds, about a mile from the bridge, with Monte Perdas de Fogu bearing 245° true.

Communication.—The steamers of the line running between Cagliari and Porto Torres, call here weekly; an omnibus service runs twice a day to Iglesias; postal communication by mail carriage with Cagliari and telegraphic communication with all lines at limited hours.

Supplies of fresh meat and vegetables are difficult to obtain.

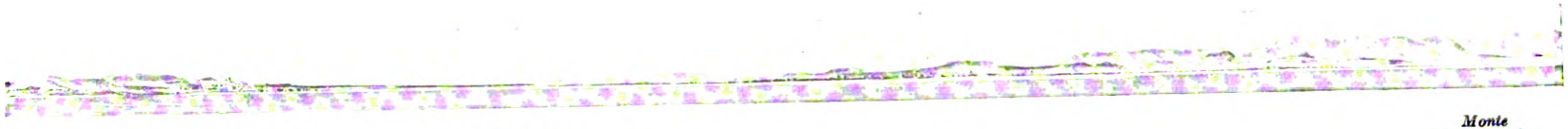
Coast. — From the bridge, the west side of the bay is nearly straight in a south-south-westerly direction for 5½ miles to Canai point and tower; for about half the distance it is fronted by a sandy beach with some cultivation, and a few cottages at the foot of Monte Perdas de Fogu, a hill 889 feet above the sea; it then becomes bold and rocky, indented by small sandy coves.

Cala Maladroxia, 3½ miles from the bridge, has a streamlet at the southern end of the beach, beyond which are several sunken rocks.

General charts 161a, 165, 2158a, 449.

La Vacca. *Monte Arbus.* *Monte Perdas de Fogu.* *Monte San Michele.* *Punta Piombo, bearing 7° true, distant one mile.*

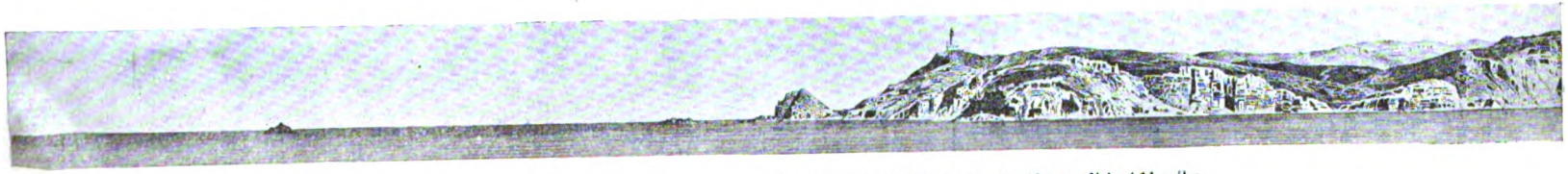
Golfo di Palmas.



Sant' Antioco castle, bearing 314° true, distant $2\frac{6}{10}$ miles. *Torre Porto Scuso.* *Monte San Michele.*

View from anchorage off Sant' Antioco.

Monte Arbus. *Torre Canai.* *Vitello.* *La Vacca, bearing 75° true, distant $1\frac{7}{10}$ miles.*



Isolotto Gallo. *Capo Sandalo lighthouse, bearing 0° true, distant $1\frac{1}{2}$ miles.*

Plan 106, Palmas bay. Var. 9° 50′ W.

Torre Canai, 95 feet above the sea, is on a low bluff point at the foot of the wooded heights of Monte Arbus, 755 feet above the sea, thence the coast is high and cliffy for 2 miles, in a west-south-westerly direction, to Cape Sperone, the western entrance point of the bay; two small rocks lie about a cable off the shore, but off the cape and Punta Canai there is a depth of 5 fathoms about 1½ cables from the shore.

Depths off-shore.—A flat of sand and stone extends for some distance outside the shore in the north-west corner of the bay, and the 5-fathom contour line rounds it 1¼ miles off, but approaches very close to the land of Cala Maladroxia, 3½ miles to the southward.

Isolotto la Vacca (*Lat. 38° 56′ N., Long. 8° 27′ E.*), situated nearly 2 miles south-eastward of Capo Sperone, and 1¾ miles southward of Torre Canai, is a steep rock, a quarter of a mile in length, in a north-north-easterly and south-south-westerly direction, and 305 feet above the sea; about 1½ cables to the north is a rock above water, named Vitello, and another off the south-west end nearly a cable distant; otherwise there is deep water around in every direction. *See* view facing page.

Canai rock or Secca della Vacca, a small rock, nearly awash, lies above a quarter of a mile from the shore half-way between Capo Sperone and Torre Canai, with a depth of 9 fathoms close outside, and 5 fathoms a little within it; there are two other rocks about a cable off the shore abreast it. Monte Orri, just open east of Monte Narcao, bearing 41° true, leads to the eastward of Canai rock and between it and Isolotto la Vacca. *See* view on plan.

Beacon.—The rock is marked by a beacon of masonry, 20 feet in height, in the form of a truncated cone on a square base, painted black and white in horizontal stripes and surmounted by a black cylinder; it is liable to be washed away.

Il Toro, an islet lying 4⅔ miles south-south-westward from Isolotto la Vacca, is about the same size, equally bold, and 364 feet high. Between the islets there are depths of 16 to 46 fathoms, and in the channel north of Vacca there are from 10 to 17 fathoms, the bottom being generally composed of sand and gravel.

Anchorage.—The spacious bay of Palmas offers safe and commodious anchorage for any number of large vessels, and has been much frequented by the British fleet; it is sheltered from all winds except those from the southward, between S.W. and S.S.E., and the sea which gets up at the entrance with these southerly winds does not reach the anchorage.

General charts 161a, 165, 2158a, 449.

Plan 106, Palmas bay. Var. 9° 50′ W.

The best berths are from about 1½ to 2 miles off the head of the bay, in 6 or 7 fathoms water; or more to the eastward, the same distance from Porto Botte. A bank extends beyond this shore for 1½ miles, having depths of 4 and 5 fathoms over it, therefore the anchorage must be chosen according to the water required; the holding ground is better on this side than along the west shore. A good position is with Torre Palmas bearing 33° true and Punta di Porto Botte 112° true, in 6½ fathoms water, over sand.

Sailing vessels, entering with strong north-west winds, often find it difficult to fetch the usual anchorage; they may therefore anchor when they have passed Torre Canai in depths of 14 or 16 fathoms, and will then be sufficiently sheltered.

Directions.—The approaches to Golfo di Palmas are readily distinguished, Il Toro being at times seen from 15 to 20 miles distant; the shores are bold, and the soundings shoal gradually towards the head. Vessels from the westward generally pass between Il Toro and Isolotto la Vacca, and for a sailing vessel with a north-west wind the channel inside the latter is more advantageous; this can with confidence be taken, even at night, by keeping well over on the island side. *See* also Caution as to Secca Pomata on page 688.

A central leading mark through this channel is given, by bringing Monte Orri just open east of Monte Narcao, bearing 41° true; these hills are table-topped, and lie to the north-eastward of Torre Palmas, before mentioned. (*See* view on plan.) A good berth should be given to the eastern shore until Torre di Cala Piombo is passed, to clear Secca di Cala Piombo, which lies more than half a mile westward of the point.

CAUTION.—From June to the end of December, it is not advisable to land the crews of vessels, especially before the rising and after the setting of the sun. All this part of the coast is very unhealthy as far round as Capo Spartivento, more particularly about the flat shores of Porto Pino, Botte, and Maladroxia, in Golfo di Palmas.

Chart 161a, and plan on 1129.

Coast.—From the bridge connecting the causeway of Isola Sant' Antioco with the main island, the sandy boundary of the lagoons (along which is a road) trends about 2 miles to the north-east to Porto Santa Caterina (*Lat. 39° 5′ N., Long. 8° 30′ E.*); a low marshy coast then curves round to the eastward to Punta Dritta, 2¾ miles north-west of the port. This point is a low spit at the foot of an isolated group of hills of moderate elevation; within it the land is level, cultivated, and backed by Monte San Michele, 1,670 feet above the sea, which is 7 miles eastward of Punta Dritta.

General charts 161a, 165, 2158a, 449.

Plan 106, Palmas bay. Var. 9° 50′ W.

From Punta Dritta the irregular low and sandy coastline has a north-north-west direction for 7 miles to Punta Nigra; about half-way is Punta Piringianu, terminating in a narrow ridge separating two bays, in the northern of which is a large salt lake, into which flows Fiume Flumentipido.

Plan of S. Pietro channel on 1129.

Porto Vesme (*Lat. 39° 12′ N., Long. 8° 24′ E.*), 2½ miles northward of Punta Piringianu, is a shipping place for minerals, and the terminus of a mineral railway which runs to Monteponi, about 2 miles from Iglesias; small vessels can enter a canal with about 5 feet water in it: at its north end is the railway station, and a small mole extends seawards from its western side.

Communication.—A daily service of steamers between the port of Carloforte; a railway to Monteponi and Iglesias, where it joins the main line to Cagliari; telegraphic communication at hours limited by the mineral company of Monteponi.

Porto Scuso, a fishing village, with 1,161 inhabitants, is about three-quarters of a mile south of Punta Nigra; about midway, and between the rocky frontage of the coast, is Porto Paglietta; an octagonal tower, Caserma Doganieri, 52 feet above the sea, stands on the head westward of the village, which is a shipping place for iron ore. There is a small, sandy bay east of the village occupied by the boats of the tunny fishery.

La Ghinghetta, 10 feet above the sea, and surrounded by rocks above and under water, lies about half a mile west-south-west of Torre Caserma Doganieri; there is a depth of about 4 fathoms between these and some rocks off the shore, but the channel is very narrow.

Capo Altano.—A steep cliff extends from Punta Nigra to Capo Altano, 375 feet above the sea, for a distance of 1¼ miles, and continues for some distance beyond the latter; a few rocks are scattered along the shore, and the cape has a depth of 6 fathoms close off it, but north-eastward of the cape and 4 cables from the coast is a shoal 1$\frac{7}{10}$ miles long with depths of 8 to 16 feet over it. About half a mile to the westward is Isolotto Porri or Meli, rugged and 36 feet above the sea, occupying, with the foul ground about it, a space of about a third of a mile in a north and south direction; the eastern side of the island has the least shoal ground off it, and the channel between the island and the cape, except for the shoal just mentioned, has a depth ot about 4 fathoms.

Chart 161a, Sardinia, southern portion.

ISOLA DI SANT' ANTIOCO, separated from the main island by the narrow boat channel before mentioned, and forming the west side of Golfo di Palmas, is nearly 10 miles in length in a north

Chart 161a, Sardinia, southern portion. Var. 10° W.

and south direction, and 5 miles east and west. The north-west and south-east sides of the island are indented, otherwise the coast is in general of a regular outline, and the western coast tolerably bold and steep-to, the circumference of the island being about 30 miles.

The island has a considerable amount of level land on the north and east, and in many places is well cultivated; the greatest elevation, Monte Perdas de Fogu, 889 feet above the sea, is nearly central, and over the southern cape, Monte Arbus, rises to a height of 755 feet. There are two villages, Calasetta at the north point, and Sant' Antioco (ancient Sulci) on a hill near the causeway.

The inhabitants of Calasetta are of Genoese origin, and those of the latter village are of Sardinian; a large number dwelling in caverns or grottoes supposed to have been used in early times for sepulchral purposes. The eastern coast of the island to Capo Sperone, the south point, has already been described on page 684.

Capo Sperone (*Lat. 38° 57′ N., Long. 8° 25′ E.*), a low and rocky projection, is backed by a cluster of wooded hills terminating in small plains, with several streams running down the valleys; there are some wells near these, but no great quantity of water can be obtained.

Signal station.—Semaphore.—A semaphore is established upon Capo Sperone, at an elevation of 574 feet above the sea.

Wireless telegraph. — There is a wireless telegraph station, open always to the general public on Cape Sperone; call letters M.P.N.

Secca Pomata.—In the latter part of the year 1867 a shoal was reported to have been found, by the coral fishermen, to the westward of Capo Sperone, having over it about 17 feet water. No such shoal was found during the Italian survey of 1880, but a coral rock of 7 fathoms was found 256° true, distant $2\frac{3}{4}$ miles from that cape, with deep water round it. Caution is therefore necessary when navigating in the vicinity.

West coast.—From Capo Sperone, a steep rocky coast bounds the western side of the island to Punta Maggiore, a distance of 8 miles; Cala Sapone, $3\frac{3}{4}$ miles from Capo Sperone, is fronted by a few rocks and gives shelter to fishing boats. A mile northward is a larger inlet named Cala Lunga, about a quarter of a mile deep, with cliffy sides, but a sandy beach at the head, into which flows a rivulet from the northern foot of Monte Perdas de Fogu; at the entrance the depth is 3 fathoms, and on both sides some rocks lie a short distance out.

General charts 165, 2158a, 449.

Plan of S. Pietro channel on 1129. Var. 10° W.

Half a mile south of Punta Maggiore is Isolotto Mangiabarca, small and bold, with a boat channel, 1½ cables in breadth, between it and the island; about half a mile westward from this islet is a shoal of foul ground on which are 8 fathoms, with 13 fathoms close around it.

Coast.—The north-west coast of Sant' Antioco is steep and rocky, though not high; it is broken by three bays with sandy beaches, in the centre one of which are salt marshes, about a cable outside of the western point of this bay, are some rocks, Secca delle Saline, awash with about 7 fathoms close outside them. For Clearing mark, *see* page 695.

Calasetta (*Lat. 39° 6′ N., Long. 8° 22′ E.*), a village with 1,451 inhabitants, may be recognised by a cylindrical tower, 95 feet above the sea, and by its church, which has a large white cupola; north-east of the tower is Isolotto Francese.

Anchorage.—The anchorage for small vessels is in 2½ fathoms, 3½ cables from the land, with the town bearing 258° true.

Communication.—A post is sent overland to Sant' Antioco.

Supplies of fresh provisions in moderate quantities may be procured; water from a well near the Marina is brackish.

Coast.—From the extreme north point of the island the low embayed shore trends for a distance of about 2¾ miles, in an east-south-east direction, to Punta Stagno Sirdo (Cirda), nearly joins Punta Dritta on the main island, and then bends round for 3½ miles to the causeway. Dry sandbanks nearly connect Punta Stagno Sirdo and Punta Dritta, and form an extensive basin between them and the causeway, having depths of from one to 7 feet over it; a few perches mark the navigable channel for the passage of the country boats.

A flat of similar depth borders the north side of the island, beyond which are scattered shallow patches extending towards the bar described later on.

Chart 161a, Sardinia, southern portion.

ISOLA DI SAN PIETRO, separated from Isola di Sant' Antioco by a channel 2 miles wide, is about 5½ miles long, and 4 miles broad. The western coast is bold and cliffy, with few hidden dangers; the central and northern part is rough and hilly, with some cultivation; towards the south it is more level, and produces, in sheltered localities, vines, figs, and olives, but little grain.

The greatest elevation, named Monte Guardia dei Mori, 692 feet above the sea, is in the northern part. There is one small lake of good fresh water on the western side, half a mile south of Cala Vinagra, and on the eastern coast, upon both sides of Monte Riciotto, are several brackish lakes and salt marshes.

General charts 165, 2158a, 449.

Chart 161a, Sardinia, southern portion. Var. 10° W.

San Pietro, known to the ancients as the Insula Accipitrum, was colonised in 1737 by ransomed captives from the African coast, between which date and 1798 it suffered many alarms and losses from Algerine pirates.

Plan of S. Pietro channel on 1129.

Punta Colonne, the southern point of San Pietro, is remarkable for the rocks which lie off it; they rise perpendicularly from the water at nearly equal distances apart, having the appearance of some vast structure; these, with a projecting, rocky tongue, extend 3 cables southward of the point.

In the bay (half a mile westward) is a small island named Genia (Genio), 3 cables south-south-westward of which is Secca di Genia (Genio), a rock with 6 feet water over it, with 8 fathoms a cable outside, but shallow towards the island. For Clearing mark, *see* page 695.

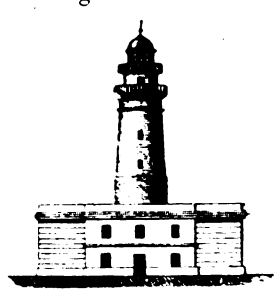
Chart 161a, Sardinia, southern portion.

Punta Spalmatore, with red cliffs, is situated 2½ miles north-west of Punta Colonne, and from it a rocky shelf, with 14 feet water over it, extends a third of a mile from the shore in a northerly direction, and partly crosses the adjacent bay of Spalmatore Grande; in the northern and larger indentation are several rocks both above and under water, about 1½ cables from the shore.

Capo Sandalo lies about 2½ miles north-west of Punta Spalmatore, and Isolotto Gallo, 30 feet above the sea, steep-to on the outside, is situated westward, distant half a mile from the cape, with a passage with depths of 14 and 16 fathoms between it and the shore. *See* view, page 685.

LIGHT (*Lat. 39° 9′ N., Long. 8° 13′ E.*).—On a rise a little within the cape is a red circular tower, with two galleries and surmounting a dwelling, the whole 100 feet in height; it exhibits, at an elevation of 439 feet above the sea, a *flashing white* light *every minute*, thus:—flash, *five and three-tenths seconds;* eclipse, *fifty-four and seven-tenths seconds.* It is visible in clear weather from a distance of 28 miles.

For arc of visibility, *see* Light list and chart.



Capo Sandalo lighthouse.

Coast.—Punta Burrona, about 1½ miles to the northward of Capo Sandalo, has a rock, with 10 feet water over it, lying a cable off its northern projection. Cala Vinagra, half a mile eastward of Punta Burrona, has an islet in the centre affording some protection to a narrow inlet, where, upon an elevated rock, is a deserted tower: there is also a chapel adjacent.

General charts 165, 2158a, 449.

Chart 161a, Sardinia, southern portion. Var. 10° W.

Punta delle Oche is situated 1½ miles eastward of Cala Vinagra and Isolotto del Agua, 52 feet high, lies in the bay westward of it; a short distance off Punta delle Oche there is a rock with 9 feet water over it.

Depths off-shore. — Along the western coasts of the islands of San Pietro and Sant' Antioco, 20 fathoms over a bottom of rock and coral, will be found at a mile off; the water then deepens abruptly, and at 9 and 10 miles distant there is no bottom at 100 and 200 fathoms.

Plan of S. Pietro channel on 1129.

Coast.—Half a mile southward of Ciminiere punta, the extreme of La Punta, the north-east promontory of the island, is Cala Lunga with several rocks about the entrance: the shore round the north-east point of the island is foul for a distance of 1½ cables, but at a quarter of a mile distant there is a depth of 12 fathoms.

Tunny fishery. — Tunny nets are laid out during the season, March to November, near Cala Lunga: they extend north-north-westward for a distance of about 7 cables from the shore. The outer end is marked, by day with a buoy, and by night with a boat exhibiting a *white* light. *See* also Caution, page 73.

CANALE DI SAN PIETRO. — The eastern coast of San Pietro is low, and forms several small bays with sandy beaches, and the whole as far as Punta Gerino (under Monte Riciotto), is fronted by a flat of dry sands and shallow patches, which extend across the channel.

Within the bar thus formed having an average breadth of 2 miles, there are bights and gullies of deeper water, but no channel for a large vessel exists; no stranger should attempt it without an efficient pilot. On the south, the channel on both sides is bold until within Punta Nera on the one hand, and the north end of Sant' Antioco upon the other.

On La Punta are some houses forming the hamlet of Scabeccieri, and 2½ miles southward is the town of Carlo forte, beyond which are several salines and stagnant lagoons terminating at Punta Nera, a dark headland three-quarters of a mile to the eastward of Punta Colonne.

LIGHT (*Lat. 39° 8′ N., Long. 8° 19′ E.*).—From the end of the landing jetty at Carlo forte is exhibited, from an iron column over a square house, the whole 23 feet high, a *red occulting* light *every five seconds*, thus:—light, *two and a half seconds*; eclipse, *two and a half seconds*. It is elevated 31 feet above the sea, and is visible in clear weather from a distance of 6 miles.

Isola Piana, nearly half a mile eastward of Ciminiere punta, is rocky, 62 feet above the sea, about a mile in circumference, and

General charts 165, 2158a, 449.

Plan of S. Pietro channel on 1129. Var. 10° W.

triangular in form, with a bold rock named La Catena lying off its northern point. Upon it is a church surmounted by a large cross, and some dwellings and a large tunny factory, coloured white, are upon the south-east coast. *See* view, page 695.

Isolotto dei Topi, a little to the southward, is smaller, 20 feet above the sea, and affords pasture for a few sheep. The channel between these islets and the shore is too much obstructed to be used by any except the coasting vessels of the country, with local knowledge.

Secca Grande, a dangerous rock, lying a mile north-eastward from the north end of Isola Piana, is about 2 cables square; the shallowest spots have 9 to 14 feet water over them, and the shoal is surrounded by depths of 7 fathoms; from the shoal of 9 feet Torre Porto Scuso bears 94° true, distant 2 miles.

Light-buoy. — A buoy, with black and red horizontal stripes, exhibiting a *flashing white* light *every three seconds*, thus:—flash, *three-tenths of a second;* eclipse, *two and seven-tenths seconds*, is moored about $1\frac{9}{10}$ cables south-eastward of Secca Grande.

Secca Martin, 3 cables north-eastward of Secca Grande, has $3\frac{3}{4}$ fathoms water over it, and Secca del Sardo, with a similar depth, is a small rock with 6 to 7 fathoms water round it, and lies half a mile southward of Secca Martin.

Secca Arena (*Lat. 39° 11′ N., Long. 8° 21′ E.*), a shoal about a quarter of a mile in extent, and having 13 feet least water, lies 220° true, distant $1\frac{8}{10}$ miles from Torre Porto Scuso. Nearly on the same line of bearing, but at a distance of $1\frac{1}{4}$ miles from the tower, is a rocky head having 20 feet water.

Buoys. — The following are moored on the western side of the channel leading from the South to the North anchorage, which has a depth of 13 feet in it.

A buoy, in 26 feet water, in the form of a truncated cone with red and white horizontal stripes, surmounted by a ball, $1\frac{1}{10}$ miles 109° true from Torre San Vittorio.

A buoy, similar to the preceding, in 20 feet water, 6 cables 85° true from Torre San Vittorio.

A buoy, similar to the preceding, 39° true, distant $1\frac{1}{2}$ miles from Torre San Vittorio.

Three buoys, each in the form of a truncated cone, with red and white horizontal stripes, surmounted by a ball, moored with Monte

General charts 161a, 165, 2158a, 449.

Plan of S. Pietro channel on 1129. Var. 10° W.

Riciotto in line with Torre San Vittorio, bearing 209° true, and distant respectively from the tower 8 cables, $1\frac{8}{10}$ and $2\frac{5}{10}$ miles.

A square black buoy, surmounted by an iron stanchion and cylinder, lies southward of Secca dei Marmi, and is 73° true, distant $1\frac{3}{10}$ miles from Torre San Vittorio.

A buoy, similar to the preceding, lies westward of Secca del Palo in 15 feet of water, and is 39° true, distant $1\frac{1}{2}$ miles from Torre San Vittorio.

A red buoy, privately owned, lies on the western extremity of North anchorage, and $8\frac{1}{2}$ cables southward of Isolotto Topi (*Lat. 39° 11′ N., Long. 8° 20′ E.*).

Submarine telegraph cable.—A telegraph cable crosses the channel from a position half a mile southward of Ciminiere punta to Porto Paglietta, on the mainland.

Pilots.—Pilots will board vessels, to which they are called, 2 miles from Carlo forte, and conduct them to the anchorage.

The following is the rate of pilotage for all vessels, whether steam or sailing:—

(1) For every vessel taken for pilotage in the limits above referred to, and taken directly to the anchorage, and vice versâ, 6 centisimi for every ton, net measurement.

(2) For every anchorage movement between the fixed limits, 3 centisimi for every ton, net measurement.

(3) For every vessel taken in the above limits and carried to the anchorage of Porto Vesme or Porto Scuso, and vice versâ, 9 centisimi for every ton, net measurement, but only 3 centisimi when the vessel has already paid pilotage.

(4) The charge for each pilotage operation will not be less than 15 lire nor more than 120 lire, whatever the tonnage of the vessel.

The charge for each movement between the fixed limits will not be less than 7 lire nor more than 60 lire, whatever the tonnage of the vessel.

The first operation, notwithstanding its taking place within the established limits, will be counted as pilotage and never as movement.

(5) Tonnage is calculated on that used for anchorage dues.

(6) The whole charge will always be due when vessels arriving call on pilots within the limits, or, going, when the pilots leave before reaching the limits.

(7) When, on account of there not being sufficient water, the piloted vessel cannot go out by the North channel, the pilot is obliged, without any claim to a greater fee, to conduct her out by the South channel, always provided the weather permits.

Plan of S. Pietro channel on 1129. Var. 10° W.

Anchorage. — Secure anchorage can, with ordinary precaution, be readily obtained by every class of vessel, under all circumstances, within the shelter of Isola San Pietro. That to the south-east of the island is the best adapted for strangers and vessels of deep draught, and especially for sailing vessels obliged to run with the strength of a north-west gale; the sound is open to winds from the South and S.W., but these rarely blow, and the sea does not enter; from the northward it is completely broken by the numerous banks previously described.

The anchor may be let go whenever the vessel is northward of the parallel of Punta Nera, either in 11 fathoms water, off that point, with Punta Colonne high rock bearing 245° true, and Torre San Vittorio 341° true; or further in, with the latter 296° true and Punta Nera 230° true, in a depth of 5½ fathoms.

The North anchorage (*Lat. 39° 11′ N., Long. 8° 21′ E.*) is better sheltered, but, as the bottom is irregular, local knowledge is desirable for large vessels (*see* view, page 695). The best berth is in 5½ fathoms water with Torre San Vittorio bearing 203° true and the extreme of La Punta 298° true, about 1¼ miles from the shore. If desirable, an anchorage may be obtained on the eastern side in depths of 7 or 8 fathoms with Torre Caserna Doganieri (Porto Scuso) bearing 22° true, and the extreme of La Punta 271° true, but there is no shelter should the wind shift to the north-west: and there are the two patches before mentioned to be avoided. Small vessels can approach the town of Carlo forte to the distance of three-quarters of a mile, where they will have 18 feet water.

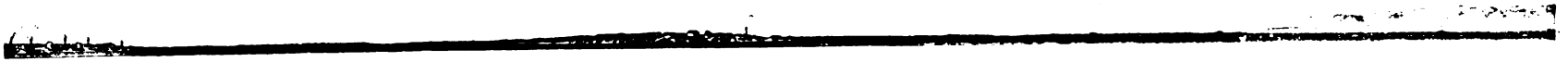
Directions.—The anchorage in the roadstead south of Isola San Pietro is easy of access in a north-west gale, but, when running for it, it is well for a sailing vessel to keep to windward, as the island is not readily distinguished in the offing, being blended with the high land behind it. On approaching the coast the western face of the island shows well from its rough and red appearance, and the lighthouse on Capo Sandalo is a good landmark either by day or night.

The southern entrance is easy, the channel being nearly 2 miles broad, with a central depth of from 10 to 20 fathoms. If the wind be favourable it is only necessary to keep in mid-channel to reach the best anchorage; but if (as is often the case) it becomes scant as the island is approached endeavour to pass close to Punta Spalmatore, but not within half a mile of Punta Genia, in order to avoid the spit of rocks off it, and having cleared the rocks off Punta Colonne, either anchor off Punta Nera, or proceed to the positions before mentioned.

The only dangers to be avoided by a sailing vessel when working to windward are the Secca di Genia, and the Secca delle Saline, the latter about 1½ cables from the land on the eastern entrance. Torre

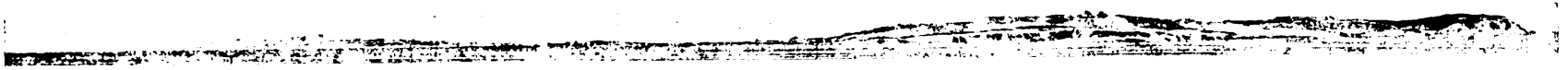
General charts 161a, 165, 2158a, 449.

To face page 695



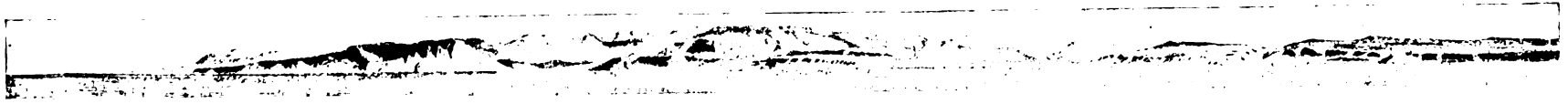
Ciminiere punta. *Isolotto Topi.* *Isola Piana.* *Scoglio Porri, bearing 21° true, distant 3¼ miles.* *Capo Altano.*

View from San Pietro north anchorage.



Isola Sant' Antioco. *Isola Piana, bearing 175° true, distant 3 miles.* *Isola San Pietro. Monte Guardia dei Mori.*

Channel between Sardinia and San Pietro.



Torre Cala Domestica, bearing 19° true, distant about 9 miles. *Pan di Zucchero (Pan del Ciel).* *Punta Nebida.* *Fontana Mare.*

Plan of S. Pietro channel on 1129. Var. 10° W.

Calasetta, in line with the western part of Monte San Michele, bearing 69° true, leads to the southward of Secca di Genia: and Punta Barca, in line with Il Toro, bearing 167° true, leads to the westward of Secca delle Saline. *See* views C and D on plan and view facing page.

Secca Grande divides the northern channel, which is nearly 2¼ miles wide, into two passages, the western of which, although narrower, is more direct, and by keeping Torre Calasetta in line with a sugar-loaf-shaped hill, named Scarparino, on the south part of Sant' Antioco, which is easily recognised, bearing 162° true (*see* view A on plan), a vessel will pass between Secca Grande and the shoal ground lying 2 cables east of Isola Piana, and westward of Secca del Arena: when Torre San Vittorio is in line with a gap west of the peak of Monte Riciotto bearing 210° true (*see* view B on plan), the vessel will then be in 5 fathoms water, and can either anchor or proceed a third of a mile further in towards Monte del Gardo, and anchor on the marks before given.

Carlo forte (*Lat. 39° 9′ N., Long. 8° 20′ E.*).—The town of Carlo forte—named after Charles Emmanuel III., King of Sardinia, the patron of the colony—was founded about 1737: on account of the incursions and depredations of the Moors from Tunis it was surrounded by a wall enclosing a considerable space, and defended by fortifications, including the strong redoubt of San Vittorio, on the point a little south of it.

There is a church, and a fine statue of the sovereign on La Marina. Carlo forte contains a population of 7,693, and has some commercial importance on account of the shipment of mineral ores from the neighbouring mines. Salt, coral, lead, and manganese are also exported. A consular agent resides at Carlo forte: Sant' Antioco and San Pietro are included in his district.

Communication.—The steamer between Cagliari and Porto Torres calls every week, and there is a daily steamer to Porto Vesme: telegraphic communication at limited hours.

Coal and supplies.—About 6,000 tons of coal are imported annually, and a small quantity might possibly be obtained; there are 20 lighters, each capable of holding 10 tons.

Supplies of fresh beef, bread, fowls, and eggs can be obtained by giving notice, but vegetables and fruit are scarce. Quail, partridges, woodcock, and rabbits are numerous in the season. Water is scarce, the inhabitants being dependent on their cisterns. Small quantities may be obtained from the wells near Torre San Vittorio and at Porto Scuso.

General charts 161a, 165, 2158a, 449.

Chart 161a, Sardinia, southern portion. Var. 10° 10′ W.

Punta Rama, 9 miles to the northward of Capo Altano, is a projecting headland, which shelters Cala Domestica, a small inlet eastward of it; a tower named after the inlet is on the headland; between Capo Altano and Punta Rama is a bay 3 miles deep, entirely open to the westward; near the head is the sandy inlet of Porto Paglia, within which, on a south-eastern elevation, are a fishing village and tunny factory, with a tower on a low point to the southward. The shore around the entrance to Porto Paglia is foul for the distance of about a quarter of a mile.

Fontana Mare lies at the head of the bay, and is marked by a group of ruined sheds with a conspicuous white chimney; the stream of the same name runs into the bay here. Beyond the mouth of the stream, the coast becomes bold and elevated into cliffs, with steep falls from the mountains behind. Several small islets lie off the shore, the largest being Pan di Zucchero (Pan del Ciel), of conical form. In this bay there are depths of from 30 fathoms water at the entrance to 10 fathoms about half a mile from the shore. *See* view facing page 695.

Tunny fisheries.—Tunny nets are laid out, during the season, March to November, northward of Capo Altano; they extend about a mile in a west-north-westerly direction. Nets are also laid out from the coast about 4 miles north-eastward of Capo Altano; they extend about 7 cables in a north-westerly direction. The outer end of the nets is marked by day with buoys and by night with a boat exhibiting a *white* light. *See* also Caution, page 73.

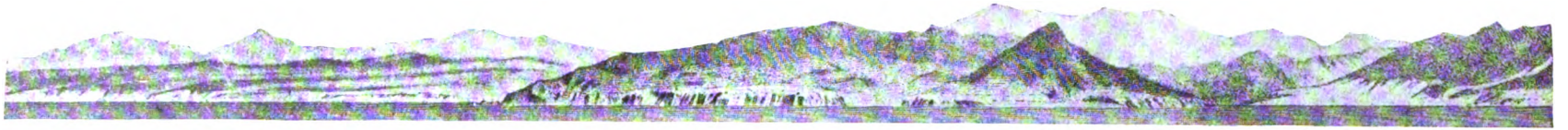
Iglesias (*Lat. 39° 19′ N., Long. 8° 32′ E.*).—About 6 miles north-eastward from Capo Altano is Monte San Giovanni, 1,286 feet above the sea: it is surmounted by a tower, and on both sides are streams flowing down to the bay a mile north of Porto Paglia. Round the slope of the mountain winds the main road to the walled town of Iglesias, which contains a cathedral, palace, several convents, and a Jesuit college, and is situated about 4½ miles from the sea, and rising above it 1,059 feet.

The soil is little adapted for cultivation, but there is some trade in wine. It is surrounded by a rich mineral district, Monte Poni mine, a mile south-west, being the most productive lead mine in the island.

Communication. — Iglesias has railway communication with Cagliari and with Montefiore, Gonnesa, and Porto Vesme; also telegraphic communication.

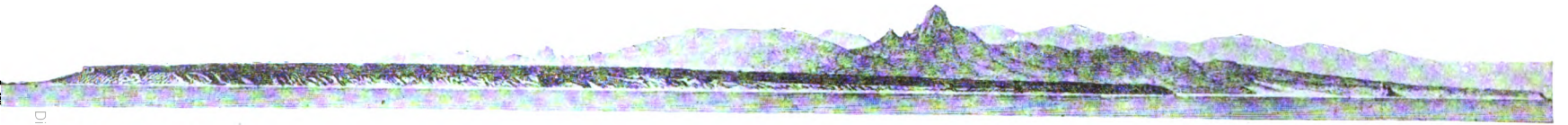
Capo Pecora lies 5 miles in a northerly direction from Punta Rama, the coast between forming a bay, the shore of which is similar to that to the southward. Punta dell Guardianu, a peak, 1,555 feet

face page 697.]



Punta dell Guardianu,
bearing 94° true, distant 9 miles.

Capo Pecora.



Capo Frasca, bearing 130° true,
distant 3¼ miles.

Monte Arcuentu
(Pollice di Oristano).

Torre Flumentorgiu.

Chiesa di
San Giovanni.

Torre di San Giovanni di Sinis,
bearing 83° true, distant 11⅔ miles.

Monte Sa. Trebina.

Capo Frasca.

Torre Flumentorgiu.
Pollice di Oristano
(distant).

Approach to il Golfo di Oristano.

Chart 161a, Sardinia, southern portion. Var. 10° 10′ W.

above the sea, is 1½ miles eastward of Capo Pecora. The bay is 1½ miles deep with a long sandy beach at the head, half a mile within the southern end of which is San Nicolo chapel; near the north is the mouth of the Flumini Maggiore, a considerable stream passing a town of that name 4 miles from the coast. *See* view facing page.

Anchorage.—Close off the sharp point of the cape there are two rocks, but the shores of the bay are otherwise bold-to, with depths of 24 fathoms at the entrance to 4 and 5 fathoms close in. Under favourable circumstances, anchorage may be obtained half a mile from the mouth of the river in about 7 fathoms water.

Buggerru. — The town of Buggerru, a little inland, has about 6,000 inhabitants, and is the chief centre of this mining district.

Communication. — There is telegraphic communication at limited hours.

Supplies of fresh provisions in moderate quantities may be procured, and water, of fair quality, obtained from a spring.

Coast.—The coast northward from Capo Pecora to Capo Frasca, a distance of 19 miles, is of an irregular outline composed of cliffs broken by small inlets, and along the southern portion there are large quantities of sand rising into barren hillocks, presenting a dreary aspect; northward the country is more cultivated, and enlivened by farms and other habitations, the whole being backed by rugged mountains and interspersed with many rivulets.

Three and a half miles inland, and about midway between the two capes, is Monte Arcuentu, or Pollice di Oristano (*Lat. 39° 35′ N., Long. 8° 33′ E.*), a remarkable peak, 2,572 feet above the sea. The district abounds in minerals, especially lead. *See* view facing page.

There are few dangers, and the depths are gradual from about 30 fathoms at 3 miles to 10 fathoms at half a mile from the shore. Round the bold head of Capo Pecora, and for 1½ miles to the north-eastward, there are a few rocks a short distance from the shore, thence for 4 miles the shore is nearly straight and chiefly of sand to Fiume Zappiani, where it again rises into cliffs without any particular character, for 7½ miles to the inlet of Flumentorgiu.

In this small bay are a tunny factory, a chapel, and a battery; it has a sandy head, but off the entrance are a few rocks, and a sunken one detached 2 cables from the head a little northward. About 1½ miles north-westward from the bay is Torre Flumentorgiu, on a point and 200 feet above the sea, thence a bold coast extends to Capo Frasca, forming (from the pinnacle over a little cove, on the south) the cultivated, level promontory of Santadi.

General charts 2158a, 449.

Chart 161a, Sardinia, southern portion. Var. 10° 10′ W.

Tunny fishery. — Tunny nets are laid out during the season, March to November, from near Torre Flumentorgiu. They extend in a westerly direction for a distance of about 1¼ miles from the coast: the outer end of the nets is marked by day with a buoy and by night with a boat exhibiting a *white* light. *See* also Caution, page 73.

Plan of Gulf of Oristano on 1128.

GOLFO DI ORISTANO, within the capes Frasca and San Marco, is the largest bay on the west coast of Sardinia; it is of an oval shape, extends 11 miles in a north and south direction, and is 5 miles deep; the entrance points are 5½ miles apart. The shore round the bay is formed of a beach bounding a succession of large lakes, which communicate with the sea by either natural or artificial channels, and the abundant fish with which they are stocked is a profitable and staple source of trade.

Beyond the salt lakes are richly-cultivated plains, terminating the broad and fertile valley which extends across to Golfo di Cagliari. The country is studded with numerous villages, farms, olive plantations, and vineyards; and in the neighbouring northern district of Milis, by the famous orange groves. Sloping to the campidano are mountain ranges, their summits at a distance of 10 and 15 miles from the coast: on the north Monte Ferru with Monte Urticu, a crater, elevated 3,440 feet; upon the east Monte Sa. Trebina, 2,605 feet above the sea, and the tabled heights of Monte Arci; and on the south the rugged peaks of Monte Arcuentu, with the remarkable formation before mentioned. *See* view, page 697.

Numerous vestiges of antiquity testify to Oristano and its neighbourhood having held a highly favoured position, but its proximity to so much stagnant water, and a want of proper drainage, result in such unhealthiness that, except during the winter and the spring, the shores of the bay are dreary and desolate in appearance.

Coast.—From Capo Frasca the coast turns to the southward for a distance of 3 miles to the entrance to Stagno di Marceddi, and midway is Torre Frasca, cylindrical and 20 feet above the sea; there is also a beacon on Capo Frasca. Torre Marceddi stands on the eastern entrance point. This lake is about 5 miles in length in a south-east direction; near the head on the southern side are the remains of ancient Neopolis and of a Roman causeway, also the chapel of Santa de Nabui.

From Torre Marceddi (*Lat. 39° 44′ N., Long. 8° 31′ E.*), the beach curves for 6½ miles to the mouth of Stagno di Sassu, passing Punta del'Arena, a long sandy spit, and an uncultivated waste between. This, the largest of the lakes and abounding with fish, extends 7 miles

Plan of Gulf of Oristano on 1128. Var. 10° 20′ W.

in length in a southerly direction, where, at its head, Fiume Mogoro enters it, flowing by the adjacent villages and vineyards of Terralba and Marrubiu, in the latter of which are vestiges of Roman baths.

Fiume Tirso, the principal river of the island, enters the gulf by a broad outlet, 3½ miles northward of that of Stagno di Sassu, the intervening space being occupied by Stagno di Santa Giusta and several smaller lakes; on the eastern bank are a village and chapel of the same name, and further eastward the village of Palmas on the borders of the Campo di Sant' Anna.

Within the mouth of the Fiume Tirso are several islets, and a communication with Stagno di Santa Giusta, and although the chief river of the island, it here becomes fordable in very dry summers. It has a tortuous eastern course of 12 miles to the foot of the hills, through a highly cultivated district with many villages on the northern side: on the left bank, 3 miles from the shore, is the walled town of Oristano.

From the entrance to Fiume Tirso the beach sweeps round to the northward and westward; on the shore 1½ miles from the entrance, and at the end of a road leading to the town, is Torre Grande (Gran Torre); westward of the tower the beach fronts Stagno di Cabras and Stagno di Mistrise, 5 miles in length and breadth, but of an irregular outline.

Along the western bank of Stagno di Cabras are numerous nuraghi or ancient monuments on slightly elevated ground, and upon the eastern shore, 1½ miles from Torre Grande, is the pretty village of Cabras, containing a population of 4,209, and a conspicuous church with a cupola.

Capo San Marco (*Lat. 39° 52′ N., Long. 8° 27′ E.*), a narrow, rocky point, projects southward and forms the north extreme of Golfo di Oristano; it is noted for its numerous remains of the ancient Grecian city of Tarras, and the earlier and rude nuraghe dwellings. The site is marked by Chiesa di San Giovanni, 167 feet above the sea, circular, white, and conspicuous, half a mile south of which is Torre di San Giovanni di Sinis, near which is a fountain, whence a small supply of water can be obtained; nearer the coast are some sepulchral excavations in the limestone rock. *See* view, page 701.

Mooring buoy.—A grey cylindrical mooring buoy lies about 2 cables southward of Torre Grande.

Anchorages.—The entrance to the bay being open to the westward, winds from that quarter in winter occasionally send in a heavy sea and surf; with off-shore winds there is excellent anchorage, and vessels could always find security within the points, in 6 and 7 fathoms water.

General charts 161a, 2158a, 449.

Plan of Gulf of Oristano on 1128. Var. 10° 20′ W.

Eastward of Capo Frasca there is anchorage, in about 7 fathoms water, with Torre Frasca bearing 192° true. Small vessels may anchor closer inshore in 3¼ to 3¾ fathoms, with Torre Marceddi bearing 154° true and Torre Frasca 229° true.

Off Torre Grande the anchorage, in 6 fathoms water, is about a mile from the shore, with Torre di San Giovanni di Sinis bearing 256° true, and small vessels may anchor closer in, at about 4½ cables from the shore, in 3½ fathoms, with the same tower bearing 249° true.

Anchorage may also be obtained eastward of Capo San Marco, in 6 fathoms, over weeds, about 4½ cables south-eastward of Torre Vecchia.

Depths off-shore. — The shores of Golfo di Oristano are bordered by a flat at very unequal distances from it; off the entrance points, a reef extends a short way out, but the shallow flat, included within 3 fathoms, extends generally over a mile from the beach, and at the northern part of the bay, between the entrance to Stagno di Sassu and Fiume Tirso, over 2 miles. Off this part are three detached banks of 13 and 16 feet water; they are about 1¾ miles from the shore, with a channel of about 3½ fathoms between. Over the bay generally there are depths of from 12 fathoms at the entrance to 8 and 6 fathoms within.

Oristano (*Lat. 39° 54′ N., Long. 8° 38′ E.*) was founded in 1070 by the inhabitants of Tarras, their former position being found too exposed to the incursions of the Barbary pirates. It is the chief town of the province, and contains a cathedral with an elevated octagon campanile, several other churches, convents, and a hospital. The produce of the district is oil, grain, flax, oranges, and salted fish: these are shipped from a small mole near Torre Grande, where also is the Custom-house. Water is scarce, although so near a river, the inhabitants being chiefly dependent for their supply on cisterns. The population is 7,107.

Communications.—The steamer running between Cagliari and Porto Torres calls every week, anchoring near Torre Grande. Oristano is a station on the railway between Cagliari and Terranova, and there is telegraphic communication; the telegraph office is open till 9 p.m. A good macadamised road runs to the north and south of the island.

Cabras has telegraphic communication at limited hours.

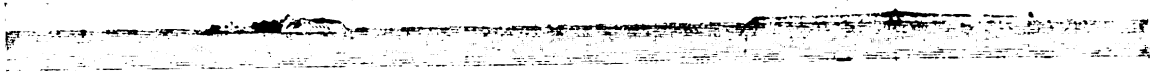
Supplies. — Cattle and provisions can readily be obtained; fuel is, however, scarce, as also is water in summer.

Charts 161a and b.

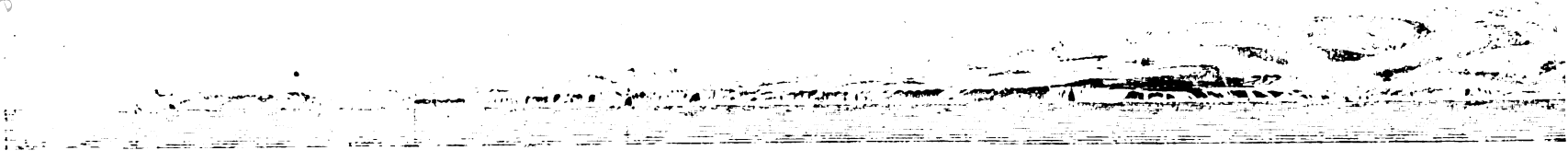
Capo Mannu, 11 miles northward of Capo San Marco, is of an irregular outline, cliffy, 157 feet above the sea and declining to the

Torre di San Giovanni di Sinis. *Capo San Marco.* *Cabras Cupola.* *Torre Grande (Gran Torre), bearing 47° true, distant 8¼ miles.* *Oristano Campanile.*

Entrance to il Golfo di Oristano.



Il Catalano, bearing 0° true, distant 2 miles. *Isolotto Mal di Ventre.*



Torre Colombargia. *Torre Foghe.* *Torre Nieddu, bearing 40° true, distant 8 miles.* *Cuglieri (town).*

Plan of Gulf of Oristano on 1128. Var. 10° 20′ W.

eastward, and wedge-shaped; on the southern head is Torre Mora, and on the northern the round white tower of Mannu.

Isolotto Mal di Ventre (*Lat. 39° 59′ N., Long. 8° 19′ E.*), 3½ miles west-south-west of Torre Mora, is a flat and rocky islet, 59 feet above the sea, 1½ miles in length, in a north-east and south-west direction, narrow, and with a reef extending for a mile off both ends in similar directions; the south-west reef is terminated by isolated rocks, named The Twins. Outside the reef, on which are several rocks above water, the water is deep. *See* view facing page.

Il Catalano, a small black rock, 36 feet above the sea, lies 6 miles southward from the south point of Isolotto Mal di Ventre; it is bold on all sides. At about 6 cables north-north-eastward of Il Catalano there is a rock with 1¼ fathoms water over it, and at 2$\frac{3}{10}$ miles in the same direction another rock, on which the depth is 4¼ fathoms, and south-westward, distant 1$\frac{2}{10}$ miles from Il Catalano, a rock with 6½ fathoms water over it. The latter is known locally as Coscia di Donna.

The channel between The Twins and the northern rock from Il Catalano is about 2½ miles wide, with depths of from 15 to 20 fathoms in the centre; the channel between Il Catalano, the dangers off it, Mal di Ventre and the shore, is from 3 to 4 miles in width, and can be safely navigated by any class of vessel, the depth being from 9 to 20 fathoms. Passing between the islets, a vessel should keep over towards the rocks which are seen above water on the Mal di Ventre reef.

Chart 161b, Sardinia, northern portion.

Coast.—Capo Marargiu lies 18½ miles northward from Capo Mannu, and between is a large bay about 4 miles deep, separated unequally into two by a point on which is Torre Nieddu; except in the southern part the shores are bold to within a moderate distance from the shore, 7 fathoms being the least depth at a mile off; across the entrance there are from 40 to 50 fathoms. The land within is high, the volcanic crater of Monte Ferru sloping from a distance of 6 miles from the coast to the streams and valleys about half-way; and the mountains above Bosa sloping down towards the river, and plain of Murtas.

About half a mile eastward of Scoglio Peloso, north-east of Capo Mannu, there is a shoal, with 2¾ fathoms water over it, off the entrance of a small bay, and for about 4 miles to the eastward the 5-fathom contour line is nearly a mile distant from the shore.

On the north point of the small bay of Cageragas (Santa Caterina), about 6 miles eastward of Capo Mannu, is Torre Pittinuri, 423 feet above the sea, and 3 miles northward, Torre Nieddu is

Chart 161b, Sardinia, northern portion. Var. 10° 20′ W.

217 feet; on a bold head a mile northward of Torre Nieddu is Torre Foghe, 233 feet above the sea; deep ravines are here scored out of the mountain lava by the winter torrents; in a small cove immediately south of Torre Foghe is the mouth of Fiume Mannu. On the northern slope, elevated 1,340 feet above the sea, surrounded by woods, are the town and castle of Cuglieri. (*See* view page 701.) Fruit is abundant.

From Torre Foghe a cliffy and indented coast trends in a north-north-east direction for 7 miles to the mouth of Fiume Bosa or Temo, having at 1½ and 3 miles distant Ruia and Colombargia towers, 167 and 108 feet respectively above the sea; round the head a little north of the former are several rocks above water, and 1½ miles eastward of Torre Ruia is Santa Vittoria chapel. An islet lies off the north point near Torre Colombargia, with 20 fathoms close outside, and beyond it, about 2 miles inland, is the town of Tres Nuraghes, these singular edifices, some of very large dimensions, being thickly scattered over the adjacent plain. The cupola of Tres Nuraghes cathedral is conspicuous.

Fiume Bosa.—Fiume Bosa or Temo (ancient Temus) flows from around and northward of Monte Leone, and receiving many tributaries from the eastward, passes under a bridge of seven arches, and disembogues in the bay, 1½ miles westward of the town to which it is navigable for boats. Off its mouth is the fortified Isola Rossa.

Porto di Bosa.—A breakwater joins Isola Rossa and the south side of the entrance of Fiume Bosa. From the shore, at a distance of 550 yards to the southward of the entrance of Fiume Bosa, a breakwater extends in a south-westerly direction, and is above water for a distance of 220 yards. Between these two breakwaters is formed the port of Bosa, with depths of from 13 to 16 feet in the centre, and 10 to 13 feet near the breakwater.

LIGHT (*Lat. 40° 17′ N., Long. 8° 28′ E.*).—An iron post, surmounting a shed, the whole 53 feet in height and situated on the south-east point of Isola Rossa, which forms the head of the breakwater, exhibits a *fixed red* light, at an elevation of 84 feet above the sea, which is visible in clear weather from a distance of 6 miles.

Town.—Bosa, containing a population of about 6,800, is beautifully situated on the north of the river, which is bounded upon both sides by table hills; behind is an olive grove, and upon an elevated site Sant' Andrea church is enclosed within ancient walls with towers. It is the capital of a district, contains a cathedral, several churches and convents, none of any particular note, but having rather an imposing appearance from the offing.

Chart 161b, Sardinia, northern portion. Var. 10° 20′ W.

Like most similarly situated places, the town is unhealthy, and is screened from the refreshing influence of the sea breeze. Timber for shipbuilding purposes is exported from the forests round the foot of Monte Ferru, and shipped from Cala Pietra Niedda, a mile south of Bosa.

The country around Bosa is fertile, and produces a considerable quantity of oil and wine; on the left bank of the river is San Pietro chapel, said to mark the site of the Roman town of the same name. Beyond are many villages scattered over the Planargia, including the town of Tres Nuraghes, near which is a stream.

Communication.—A weekly steamer to Cagliari, Porto Torres, and intermediate ports; Bosa is connected at Macomer with the main line to Cagliari; telegraphic communication at limited hours.

Supplies of fresh provisions may be obtained: water is scarce and not very good.

Capo Marargiu (*Lat. 40° 20′ N., Long. 8° 25′ E.*).—From the mouth of the river, a succession of indented trap cliffs extend for 5 miles north-west to Capo Marargiu; midway is Torre Argentina, 108 feet above the sea. A few rocks lie off the intervening shore, and an islet of moderate height outside the cape; a third of a mile west-south-west of the cape is a rocky shoal with 2¾ fathoms water over it. The coast beyond is bounded by steep cliffs, the land sloping up to Monte Tarattala which is 2,556 feet, and 3 miles northward of the cape Monte Mannu is 2,635 feet, above the sea. *See* view, page 704.

Plan of Ports Conte and Alghero on 1128.

Porto and Punta Poglina.—Nine miles northward of Capo Marargiu is the rocky port and beach of Poglina, a favourite resort of the coral fishermen, and 1½ miles westward from the port is the point of the same name. At the base of this projection is a bare rock, and on an elevation, a little within the point, a tower, 213 feet above the sea, whence the coast trending in a northern direction for the city of Alghero is low and rocky, backed by cultivated hills of moderate elevation.

Water.—In Cala Cantaro a supply of good water can be procured from a spring half-way up the hill; it is a little southward of Cala Buona, the resort of the boats of the coral fishery.

RADA DI ALGHERO.—From the point on which the city of Alghero is built, nearly 4 miles northward of Punta Poglina, the coast turns to the westward, to Capo Caccia, the extreme headland, which bears 270° true, and is distant 7 miles: between are two bays, the eastern Rada di Alghero, the western Porto Conte. Rada di Alghero is 3 miles wide across the entrance to Capo Galera, and about 2 miles deep: its eastern shore is low and sandy,

Plan of Ports Conte and Alghero on 1128. Var. 10° 20′ W.

with a shallow lake, named Stagno di Calich, at the head; the western is rocky, broken by points or projections from Monte Doglia, 1,430 feet above the sea; the land about the bay is well cultivated, and an extensive plain (covered with the fan palm) runs north to the shores of Golfo dell' Asinara.

Within Capo Galero are a tower and lazaretto. *See* view facing page.

Isolotto Maddalena.—On the eastern side of the bay is Isolotto Maddalena, rocky, 13 feet above the sea, with a ruined chapel on it; it lies about 6 cables from the shore, and nearly on the boundary of the shallows projecting from it, which extend from the town to the head of the bay. Upon this flat, and over the rocky spit lying a third of a mile north-westward of the town, there are from 9 to 15 feet water; the western shore is less shelving, and over the bay there is a gradually decreasing depth from 15 fathoms at the entrance, to about 5 fathoms at 2 cables from the western side.

Plan of Port Alghero on 1128.

Alghero.—The city of Alghero is built upon a low rocky point jutting out from a sandy beach; its mediæval walls are surrounded on three sides by the sea, and entered by two gates, one being on the north side, near the landing place. It was long a favourite possession of Spain, and once the principal station for trade with Genoa, and contains a population of 10,741. *See* view facing page.

Light (*Lat. 40° 34′ N., Long. 8° 19′ E.*).—On the north-west bastion at Alghero a small circular tower, 21 feet in height, exhibits, at an elevation of 46 feet above the sea, a *fixed white* light, which in clear weather is visible from a distance of 4 miles.

Secca del Traditore, with 6 feet water over it, lies 2½ cables westward of this point.

Communication.—A steamer every fortnight to Cagliari, Porto Torres, and intermediate ports, a railway to Sassari, and telegraphic communication. The telegraph office is open till 9 p.m.

Supplies of fresh provisions are abundant, but water is scarce.

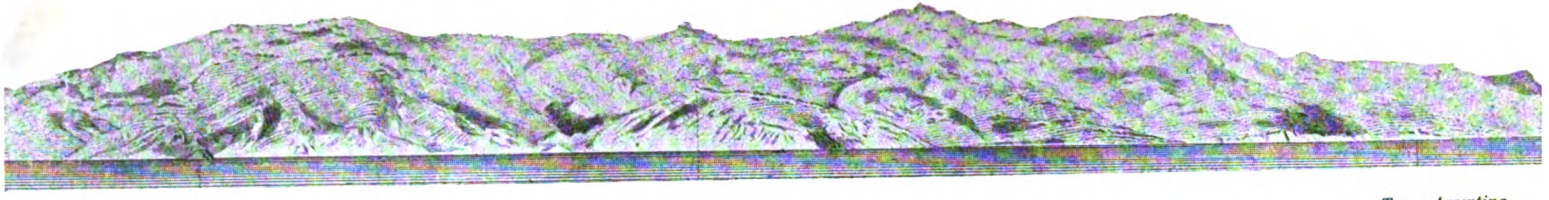
Trade.—Alghero is one of the chief resorts for the boats engaged in the coral fishery, and exports, besides that article, wine, wool, tobacco, and anchovies. The silky filaments of the Pinna marina has also afforded a branch of trade, being woven into gloves both at Cagliari and Naples.

Plan of Ports Conte and Alghero on 1128.

Stagno di Calich, at the head of the bay, receives the streams of the rivers Cantarella from the north and Serra from the east; from the lake abundant supplies of fish are procured. Over the entrance channel there is a rudely-constructed bridge of several arches.

General charts 161b, 2158a, 449.

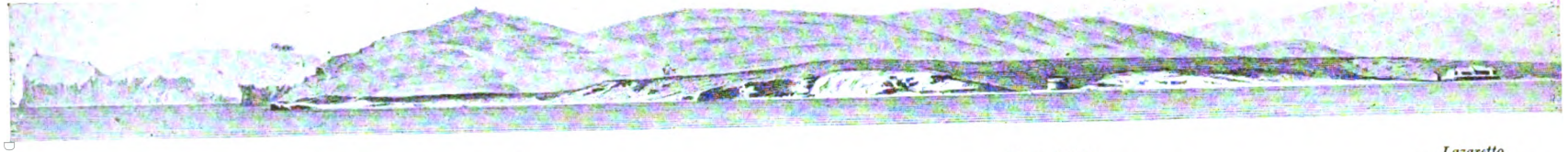
To face page 704.]



Isola Pelosa. Monte Mannu.

Capo Marargiu,
bearing 66° true, distant 5¼ miles.

Torre Argentina.



Capo Caccia.

Capo Galera.
Torre Giglio
(behind).

Monte Ramazino.

Torre Galera,
bearing 286° true, distant $1\frac{3}{10}$ miles.

Lazaretto.
Monte Timidone
(distant).

Rada di Alghero.

Campanile, bearing 112° true,
distant $1\frac{7}{10}$ miles.

Alghero.

No. 952.—CAPE CACCIA LIGHT—ALTERATION IN CHARACTERISTICS.

Position.—Lat. 40° 33½′ N., long. 8° 09¾′ E.

Details.—The alternating fixed and flashing white and red light has been replaced by a light having the undermentioned characteristics:—

Character.—A *flashing white* light every *twenty second*, thus:—

Flash,	eclipse,
$1\frac{8}{10}$ secs.	$18\frac{2}{10}$ secs.

Elevation.—610 feet.

Visibility.—28 miles.

Chart No. 1128. Med. 1, p. 705.

2 i

Plan of Ports Conte and Alghero on 1128. Var. 10° 20′ W.

Anchorages. — There is good holding ground about 1½ miles north-west of the town in from 8 to 10 fathoms water, where a convenient summer anchorage may be taken up.

Small vessels anchor in about 4¾ fathoms water, over weeds, half a mile north-north-west of the lighthouse, and south of Isolotto Maddalena; there is also anchorage about 2 cables to the eastward of Torre Galera, in 7½ fathoms water, over weeds and sand.

PORTO CONTE, separated from Rada di Alghero by a hilly projection, which trends about 2 miles to the westward to Punta del Giglio, on which there is a tower 295 feet above the sea, is 2 miles wide at its entrance, extends 4 miles in a north-east directon from Capo Caccia, and terminates in a sandy beach; its western shores are rocky and indented. The 5-fathom line is about 1⅓ miles and the 3-fathom line about three-quarters of a mile from the head of the bay, but outside this the shores on both sides are tolerably bold, and the depths are from 30 fathoms at the entrance to 5 or 6 fathoms abreast the Custom-house. *See* view, page 706.

Water can be obtained at Porto Conte, and other supplies from Alghero, a distance of 8 miles.

Anchorage.—Although this bay is exposed to the south-west it is a safe anchorage; large vessels anchor abreast the Custom-house in a depth of about 6 fathoms; small vessels find better shelter north-east of it, in 3 and 4 fathoms, over a bottom of mud and sand, with some weeds. In winter north-west winds blow with great violence across the plain.

Capo Caccia, a promontory terminating a range of high cliffs, which bound Porto Conte on the west, is 610 feet above the sea. *See* view on plan.

About a cable northward of Capo Caccia, and on the west side of the peninsula, is the entrance to the Grotto of Neptune (ancient Grotta Azzurra); it is a little above the surface of the water, and the face of the rock at the landing place has from 8 to 9 fathoms water close-to.

LIGHT (*Lat. 40° 34′ N., Long. 8° 10′ E.*). — On Capo Caccia a white circular tower, surmounting a dwelling, the whole 78 feet in height, exhibits, at an elevation of 610 feet above the sea, an *alternating fixed white* and *flashing red* light *every two minutes*, thus: fixed *white, one hundred and two seconds;* eclipse, *seven and a half seconds; red* flash, *three seconds;* eclipse, *seven and a half seconds;* it is visible in clear weather from a distance of 26 miles.

Capo Caccia lighthouse.

Signal station. — Semaphore. — At about 900 yards north-north-westward of the

General charts 161b, 2158a, 449.

Plan of Ports Conte and Alghero on 1128. Var. 10° 20′ W.

lighthouse on Capo Caccia, is a semaphore station, 607 feet above the sea, with which vessels can communicate.

Coast.—Three-quarters of a mile northward of the cape is Isolotto Foradada, 597 feet, and perforated, and 2 miles further, in the same direction, Isolotto Piana, 351 feet above the sea; both islets are steep. On the highest summit of the cliffs, southward of Isolotto Piana, is Torre Pegna, elevated 918 feet above the sea, and Punta delle Gessiere, so named from the gypsum there obtained, is situated $1\frac{3}{10}$ miles northward of Isolotto Piana. Capo Cassia may be rounded at any distance, as it is very bold, as well as the coast to Punta delle Gessiere. *See* view facing page.

Chart 161b, Sardinia, northern portion.

Porto Ferru, or Girato, $4\frac{1}{2}$ miles north-eastward of Punta delle Gessiere, is a small, well-sheltered, boat cove, with a sandy beach at the head, near which are some ruins; midway is Torre del Porticciuolo, 131 feet above the sea, and there are towers on each entrance point; Rossa, the southern, 610 feet, and Ferru, the northern, 210 feet above the sea. About a mile within the port is Barace salt lake, into which run several rivulets from the rocky heights of Monte Forte, 1,526 feet above the sea on the north; south and east of Porto Ferru the land is low, and the city of Sassari, 17 miles inland, can be seen over it from the offing.

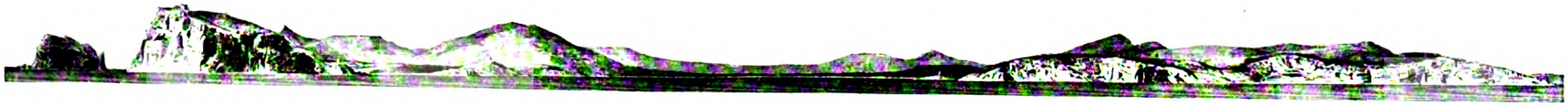
Capo dell' Argentiera, $10\frac{1}{2}$ miles to the northward of Capo Caccia, is the steep termination of a spur from Monte della Nurra; the land within is covered with brushwood and wild olive trees. A few rocks lie off the north cliffs, but they are close in, and deep water will be found on all sides with 70 fathoms, over coral bottom, at about 4 miles from the cape.

Capo Negro, about 4 miles north-eastward of Cappo dell' Argentiera, is a table-shaped cliff, and 6 miles further in the same direction, Isola Porri, 187 feet above the sea, and conical-shaped, lies close to the shore. From Isola Porri the coast trends north-westward for about 4 miles, to Punta Coscia di Donna, which has several rocks, both above and below water, extending from it.

Capo Falcone (*Lat. 40° 58′ N., Long. 8° 14′ E.*), the northern extreme of a peninsula which extends from Monte della Nurra, has a tower on its highest summit, 633 feet above the sea; on the south side of the point a white rocky coastline extends fully 3 miles, sloping southward to a sandy neck, where are several salt lakes.

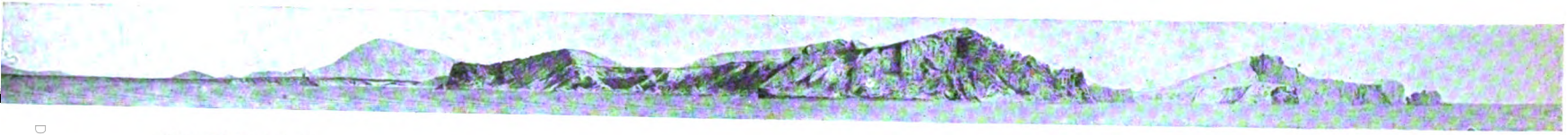
ISOLA ASINARA (ancient Herculis insulæ), entirely mountainous with good pasture, and in places covered with the wild olive tree, is inhabited by a few farmers and fishermen; where cultivated the island produces good fruit and corn; tortoises, as well as wild

General charts 2158a, 449.

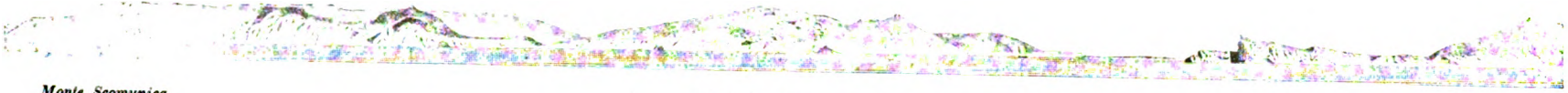


Capo Caccia lighthouse, bearing 341° true, distant 2 miles. *Torre Bollo.* *Monte Timidone.* *Torre Nuova.* *Torre Giglio.*

Porto Conte.



Torre del Porticciuolo. *Monte Doglia.* *Punta delle Gessiere.* *Isolotto Piana.* *Torre Pegna (behind), bearing 144° true, distant 5 miles.* *Isolotto Foradada.*



Monte Scomunica. *Monte Maestra.* *Castellazzo.* *Isola Piana.* *Capo Falcone.* *Torre Falcone, bearing 79° true, distant 6½ miles.*

Isola Asinara and Capo Falcone.

No. 383.—ASINARA LIGHT—ALTERATION IN CHARACTER.

Position.—On Caprara point.

Lat. 41° 07¼′ N., long. 8° 19½′ E.

Alteration.—The character of the light has been altered from fixed white to *group flashing white*, showing *two* flashes *every thirty seconds*, thus:—

Flash,	eclipse,	flash,	eclipse.
5 secs.	5 secs.	5 secs.	15 secs.

Chart No. 161*b*. Med. 1, p. 707

Chart 161b, Sardinia, northern portion. Var. 10° 30′ W.

goats abound. It is 9½ miles in length in a north-easterly and south-westerly direction, 3½ miles in breadth at its northern extremity, and very irregular in outline, and nearly intersected in three places by narrow ravines. The principal elevations are Monte Scomunica, 1,335 feet, and La Maestra, 1,273 feet, near the north end of the island, and Monte Maestra, 876 feet above the sea near the south extreme.

The south-western point of Isola Asinara is about a mile from Capo Falcone, the sound between being occupied by Isola Piana, which is low, and has a tower on it, the narrow passages on both sides are studded with sharp rocks, on a connecting shallow flat with from 7 to 11 feet over it. *See* view, page 706.

Beacons.—Four beacons of masonry, in the form of truncated cones, and painted black and white in horizontal stripes, are placed near the south-west point of the island for use as leading marks through the channel between it and Isola Piana; it is stated that there is 13 feet water in the passage, but it cannot be attempted with any sea.

LIGHT (*Lat. 41° 7′ N., Long. 8° 19′ E.*).—At Punta Caprara, or Scorno, the north point of Asinara, is a white circular tower, surmounting a white dwelling, the whole 117 feet in height, exhibiting, at an elevation of 262 feet above the sea, a *fixed white* light, which in clear weather is visible from a distance of 21 miles. *See* view, page 711.

Signal station.—Semaphore.—At about 900 yards to the south-westward of the lighthouse is a semaphore station, 377 feet above the sea, with which vessels can communicate.

Storm signals are exhibited here. *See* page 69.

Depths off-shore.—From 20 to 30 fathoms will be found half a mile off the coast, and the 100-fathom line is from 3 to 3½ miles distant.

Oliva.—About 3 miles southward of Punta Caprara, at Cala d' Oliva, are the buildings of the convict settlement, and on a small promontory there is a tower, 66 feet above the sea.

Rada della Reale.—There are some good boat coves, and a convenient anchorage for shipping in Rada della Reale, on the east side of Isola Asinara, within Punta Trabucato. Between this point, 3 cables southward of which lies a rock with a depth of 5 feet over it, and the narrow neck of land to the westward, the distance is 3 miles, and half-way, is Secche della Reale, a cluster of rocks above water, with a spit of 11 and 13 feet, half a mile north-west and south-east

General charts 1780, 2158a, 449.

Chart 161b, Sardinia, northern portion. Var. 10° 30′ W.

of it. There is anchorage on either side, in convenient depths, over muddy bottom.

LIGHT (*Lat. 41° 3′ N., Long. 8° 18′ E.*).—On the north-western end of Secche della Reale, from a masonry tower, is exhibited, at an elevation of 45 feet above the sea, an unwatched *flashing white* light *every five seconds*, thus:—flash, *half a second;* eclipse, *four and a half seconds;* it is visible in clear weather from a distance of 12 miles.

Light-buoy.—At the south-eastern end of Secche della Reale a light-buoy is moored, in 10 fathoms of water; it exhibits a *flashing red* light *every four seconds*, thus:—flash, *three-tenths of a second;* eclipse, *three and seven-tenths seconds.*

Communication.—Steamers running between Cagliari and Porto Torres, call at Cala d' Oliva, and there is telegraphic communication.

Rada dei Fornelli, on the south side of Asinara, is between Punta Barbarossa and Isola Piana. There is anchorage, with good holding ground, in about 10 fathoms of water, in the middle of the bay, and 6 cables from the land.

GOLFO DELL' ASINARA.—The deep indentation on the north coast of Sardinia, between Asinara and Capo Testa, may be comprised under this name; it is 39 miles across the entrance, and about 20 miles deep. The shores present no very marked feature; in the western bight, between Punta Falcone and Porto Torres, they are low and sandy, also near the Fiumi Sorso and Coghinas; along the remainder a rocky coast bounds a range of hills of considerable elevation.

With the exception of Secca di Castel Sardo (*see* page 711) and the rocks off Castel Sardo, all dangers lie within half a mile of the shore; the depths are from 20 to 40 fathoms at 3 miles off, but further out towards the entrance the bottom is very uneven, depths of from 90 to 300 fathoms being found but a short distance apart; the bottom is fine sand and shells, with some clay.

From Punta Nera, 2 miles south-eastward of Punta Falcone, a rocky shore trends to the southward for nearly 3 miles to Torre delle Saline, near which are a tunny factory and good boat harbour; thence past several salt lakes, 3½ miles south-south-east, is the outlet from the large lake of Pilo, and 6 miles further eastward is Porto Torres.

Tunny fishery.—Tunny nets are laid out, during the season, March to November, for a distance of $2\frac{2}{10}$ miles in a north-easterly direction from Torre delle Saline. The outer end of the nets are marked by day with two buoys. *See* also Caution, page 73.

General charts 1780, 2158a, 449.

No. 1128.—Port Torries, Inner Harbour—Alteration in Character of Lights.

Position.—Inner harbour entrance, lat. 40° 50½′ N., long. 8° 24′ E.

1. Inner East Mole light:

Alteration.—The character of the light has been altered from fixed red to *flashing red every two seconds*, thus:—

Flash,	eclipse.
$\frac{3}{10}$ sec.	$1\frac{7}{10}$ secs.

2. Inner West Mole light:

Alteration.—The character of the light has been altered from fixed green to *flashing green every two seconds*, thus:—

Flash,	eclipse.
$\frac{3}{10}$ sec.	$1\frac{7}{10}$ secs.

Caution.—See Admiralty Notice to Mariners No. 322 of 1916 with reference to the extinction of Italian lights.

Chart No. 1128. Med. 1, p. 709.

No. 1128.—Port Torres, Inner Harbour—Alteration in Character of Lights.

1. Position.—Inner harbour entrance, lat. 40° 50½′ N., long. 8° 24′ E.

Inner East Mole light:

Alteration.—The character of the light has been altered from fixed red to flashing red every two seconds, thus:—

$$\frac{\text{Flash,}}{\frac{3}{10}\text{ sec.}} \quad \frac{\text{eclipse.}}{1\frac{7}{10}\text{ secs.}}$$

2. Inner West Mole light:

Alteration.—The character of the light has been altered from fixed green to flashing green every two seconds, thus:—

$$\frac{\text{Flash,}}{\frac{3}{10}\text{ sec.}} \quad \frac{\text{eclipse.}}{1\frac{7}{10}\text{ secs.}}$$

Information.—See Admiralty Notice to Mariners No. 322 of 1918, [illegible] reference to the extinction of Italian lights.

Chart No. 1128. Med. 1., p. 70[illegible]

No. 210.—Port Torres—New Mole under Construction.

Position.—Head of new mole, lat. 40° 50¾′ N., long. 8° 23¾′ E.

Details.—Works are in progress at Port Torres for the construction of an Outer West mole. The head of the new mole will be at a distance of about 220 yards, westward, from the head of the Outer East mole, from thence the mole will extend in a south-westerly direction for a distance of about 370 yards, and thence in a southerly direction to the shore.

Note.—The outer end of the new mole is to be marked "*Approx. posn. of West Mole in course of construction (1916)*," on the plan on chart No. 1128.

Chart No. 1128.

Med. 1, p. 709.

Plan of Porto Torres on 1128.

PORTO TORRES is formed by two inner moles, and an outer mole extending from the inner end of the Inner East mole in a north-east direction for about 400 yards, and then curving in a north-west direction for a distance of 550 yards, the greater part of the outer space having depths of from 4 to 5½ fathoms, and most of the inner port (Porto Vecchio) from 18 to 21 feet. Dredging operations were in progress inside the Outer mole, but in 1912 were suspended.

Caution.—On account of the deposits washed down by the Torrente Turritano, the depths in the outer harbour are now less than those shown on the plan.

LIGHTS (*Lat. 40° 51′ N., Long. 8° 24′ E.*).—**Outer mole.**—A small cylindrical iron building, 23 feet in height, and situated on the extremity of the Outer mole, exhibits, at an elevation of 33 feet above the sea, an *occulting red* light *every five seconds*, thus:—light, *three and a half seconds;* eclipse, *one and a half seconds;* in clear weather it is visible from a distance of 5 miles.

East mole.—An old octagonal tower, 49 feet in height, situated near the harbour office at the root of the Inner East mole, exhibits, at an elevation of 65 feet above the sea, a *fixed white* light, which is visible in clear weather from a distance of 13 miles.

A *fixed red* light is shown from a post 16 feet high at the mole head; it is elevated 20 feet above the sea, and is visible in clear weather from a distance of 2 miles.

West mole. — A *fixed green* light is shown, at an elevation of 16 feet above the sea, from an iron mast, 10 feet in height, and situated at the extremity of the West mole; it is visible in clear weather from a distance of 2 miles.

Buoys. — A white buoy lies in the entrance to Porto Vecchio, on the edge of the shoal water extending eastward from the West mole. A mooring buoy lies in Porto Vecchio, about 1⅓ cables westward from the lighthouse at the root of East mole.

Pilots may be obtained.

The following is the rate of pilotage:—

Vessels of not more than 50 tons, 30 centisimi per ton.

From 51 to 100 tons, 15 lire for the first 50 tons and 25 centisimi for each additional ton.

From 101 to 150 tons, 27½ lire for the first 101 tons and 20 centisimi for each additional ton.

151 tons and over, 37½ lire for the first 151 tons and 10 centisimi for each additional ton.

The maximum charge will in no case exceed 65 lire.

Vessels anchored in the roads which engage a pilot to enter the port will pay the fixed sum of 10 lire.

General charts 2158a, 449.

Plan of Porto Torres on 1128. Var. 10° 30′ W.

Pilots should, when requested, conduct vessels leaving up to half a mile beyond the entrance to the port, always provided the state of the weather permits.

Anchorage. — Tolerably good anchorage may be obtained in 10 fathoms water about 2 cables north-eastward of the head of the Outer mole. With winds from N.W. to N.E. vessels should seek shelter in one of the anchorages of Isola Asinara.

Town.—Torres is of ancient date, as testified by the Roman ruins surrounding it, and is, with Alghero, the port of trade for Sassari and its district. It is defended by a large square tower, and the town is one long street in which is the old cathedral of San Gavino; the population is 4,225. The climate is said to be unhealthy.

Torrente Turritano enters the sea a little west of the port, and is crossed near the mouth by a substantial Roman bridge of seven irregular arches. The country around Torres is bare, scattered with a few palm trees and brushwood.

Communication. — Weekly steamers to Genoa, Leghorn, Spezzia, Bastia, and to Ajaccio in Corsica; fortnightly to Maddalena, Castel Sardo, Santa Teresa, and Bona. The railway from Torres joins the main line between Cagliari and Terranova at Chilivani junction; there is telegraphic communication at limited hours, and a good macadamised road of 11 miles leads to Sassari, and thence to Cagliari, a distance of 146 miles.

Coal and supplies. — About 750 tons of coal are kept in stock, and 200 tons could be put on board in 24 hours, weather permitting; there are 6 lighters.

Fresh provisions may be obtained, and the water is of good quality.

Trade.—The exports from the district are chiefly oil and wine.

Chart 161b, Sardinia, northern portion.

Sassari (*Lat. 40° 43′ N., Long. 8° 34′ E.*), the second city in the island and capital of the province, situated upon rising ground of 722 feet above the sea, 10 miles from Porto Torres, is enclosed by walls with towers, and has a citadel, now used as a barracks; it contains a cathedral, numerous churches, several convents, a university, official establishments, and a famous marble fountain adjacent. The population was 42,340 in 1911. A Vice-Consul resides at Sassari.

Coast. — From Punta di San Gavino a Mare (a little eastward of Porto Torres) to Punta Pedras de Fogu, distant 10 miles, is a low coast, chiefly of sand; midway on a hill, 430 feet above the sea, is the town of Sorso; the church with cupola and steeple being conspicuous. Punta Pedras de Fogu and the coast east of it is rocky, and slopes

Torre Arena. *La Maestra.* *Punta Caprara or Scorno lighthouse, bearing 212° true, distant 2¼ miles.* *Monte Scomunica.* *Capo Molla.*

Castle, bearing 136° true, distant one mile. *Torre di Frigiano.* *La Contralta (peak).*

Castel Sardo.

Chart 161b, Sardinia, northern portion. Var. 10° 20′ W.

up to the Edera plain, which is 1,959 feet above the sea; off the shore are many scattered rocks extending for a distance of a quarter of a mile, but the 5-fathom line will be found a little beyond that distance.

Castel Sardo, a small fortified town about 4½ miles east-north-eastward of Punta Pedras de Fogu, occupies an elevated position immediately over the sea, and was, under the Spaniards—its former possessors—named Castel Arragonese; it has been a place of considerable note, but now contains a population of only 2,341.

There is a citadel on a crag, 374 feet above the sea, to the south-west of the town, and on both sides of the crag (which are of volcanic origin and from 200 to 300 feet in height) are small coves, adapted for a few coasting vessels, but they are much exposed; that to the westward has a sandy beach, and is partly sheltered by a small islet, on which are some ruins. Close off the castle point is another islet, beyond which there is deep water. *See* view facing page.

Anchorage may be obtained north-eastward of the castle, in from 14 to 16 fathoms water.

Rocks.—Situated within a mile in a north-westerly direction from the Campanile of Castel Sardo are two rocky patches with 7 and 9 fathoms water over them, the outer, named Secca di Frigiano, with the latter depth, north-westward from the point; the water is deep around them, and with northerly winds there are heavy overfalls. Secca di Punta Spinosa, about a mile westward of Castel Sardo, has a depth of 5 fathoms over it.

Communication. — A steamer every week to Porto Torres, Leghorn, and Genoa, and telegraphic communication.

Secca di Castel Sardo (*Lat. 41° 0′ N., Long. 8° 44′ E.*), at a distance of 5 miles, 9° true, from Castel Sardo, a more dangerous shoal having 6 fathoms over it, extends about half a mile in the same direction, beyond which there are 20 and 30 fathoms, and about the same depth between it and the shore. This shoal was formerly supposed to have only 4 fathoms water, but 6 fathoms was the least water found during the Italian survey, 1879.

Coast. — From Castel Sardo, the coast, partly rocky, but chiefly of sand, extends in an east-north-easterly direction to Capo Monte di Fava, 10½ miles distant, and has generally a depth of 5 fathoms within half a mile of the sandy beach, except about 3 miles eastward of Castel Sardo, where that depth is nearly a mile from the shore. Nearly midway between the capes is a narrow lake into which flows the Fiume Coghinas, the second largest river in the island; on the eastern side the country is well wooded, and on the western richly

Chart 161b, Sardinia, northern portion. Var. 10° 10′ W.

cultivated. Rising above the plain, 5 miles to the south-east, is Castel Doria, a square tower on an isolated mountain, 791 feet above the sea, westward of the river.

Capo Monte di Fava, a low, rocky projection, is separated from the western point, 88 feet above the sea, off which is the bare islet of Rossa, by Cala Falsa, a small cove with about 8 fathoms water in it; a few rocks fringe the shores, and there are depths of 20 fathoms a quarter of a mile from the point, on which stands Torre Monfronara, 75 feet above the sea.

From Capo Monte di Fava a bleak iron-bound coast trends in a north-east direction, for a distance of 10 miles, towards Punta Vignola, backed by the slopes from the mountainous range of Monte della Spina, 2,625 feet, and Monte Giuncana, 1,795 feet above the sea, down which flow a few small streams. Detached rocks lie at a short distance off the shore, the furthest distant being Secca di Moli, which is 6 miles from the cape, and about 4 cables off-shore.

Chart 1189, Bonifacio strait.

Punta Vignola, on which there is a round tower, 62 feet above the sea, lies 3 miles beyond Secca di Moli, and a short distance south-east of it are the village and boat port of the same name, to which the coral fishermen repair for shelter and water, and find tolerable security near the round tower. The country eastward of this to Santa Reparata is a barren waste; within the point there is a valley (watered by a river from the mountains) covered with the wild olive and the vine, and abounding in tortoises; westward as far as Capo Monte di Fava it is a wooded uncultivated tract.

Capo Monte Rossi (*Lat. 41° 9′ N., Long. 9° 7′ E.*).—Between Punta Vignola and Capo Testa, 7½ miles distant, the coast forms a spacious bay about 4 miles in depth to Cala Vall'Alta. A bold headland of red granite, 292 feet above the sea, lies 3 miles eastward from Punta Vignola; it is named Capo Monte Rossi, and close off it is a small islet. On both sides of the cape is a sandy plain, readily distinguished from the offing; that on the east named Arena Grossa, and the other Arena Maggiore. Off this latter beach, nearly half a mile from the mouth of a stream, is the islet of Connetta, round which and off the shore are some rocks under water.

Cala Vall'Alta is about 2½ miles eastward from Capo Monte Rossi and 4 miles southward of Capo Testa. Northward of Cala Vall'Alta is a broken rocky coast as far as the sandy neck, which connects Capo Testa with the land about Porto Longosardo. A few islets and rocks lie off the shore; the south of the isthmus is a considerable reef which fringes the shore to the distance of 2 cables; the bight south

General charts 1780, 676, 2158a, 449.

Chart 1189, Bonifacio strait. Var. 10° W.

of the isthmus is named La Corba, which has depths of from 5 to 10 fathoms, and where shelter will be found with north-easterly winds.

Water.—At La Corba fresh water may be procured from a source near the sea.

BONIFACIO STRAIT, between the north end of Sardinia and the south end of Corsica, is 6½ miles wide; several islands with passages between them lie off the coasts of either island, narrowing the main channel, or strait, to 3 miles in breadth. The passages between the islands of Porraja, Ratino, and Cavallo, which are convenient for steamers or vessels with a fair wind, are described in Mediterranean Pilot, Vol. II., and the passages between the Intermediate islands and the coast of Sardinia have already been described. *See* pages 539-554.

Bocca Grande or main channel, or properly called Stretto di Bonifacio, lies between Isola di Razzoli (Sardinia) and Isola di Lavezzi (Corsica), which islands lie in a north-west and south-east direction, distant 3½ miles from each other.

Secca di Lavezzi, lying one mile, 194° true, from the lighthouse on Isola Lavezzi, is a dangerous rocky shoal, with 8 feet water over it; it is steep-to on the south side, but on the north is foul.

Beacon.—A circular stone safety beacon, about 30 feet in height, with red and black horizontal stripes and surmounted by a refuge, marks Secca di Lavezzi.

A ledge of rocks, about 10 yards in extent, with 3½ fathoms least water, and 9 to 10 fathoms close-to, is situated 40° true, distant 3½ cables from the beacon.

LIGHT (*Lat. 41° 19′ N., Long. 9° 15′ E.*).—From the beacon on Secca di Lavezzi, at an elevation of 54 feet above high water, an unwatched *group occulting white* light *every ten* to *fifteen seconds*, is exhibited from a lantern with a white cupola. It shows *three* eclipses, the duration of light in the group being one-third of that between the groups; it is visible in clear weather from a distance of 7 miles.

Detached shoals. — A bank, with less than 10 fathoms water, extends nearly half a mile southward of the beacon; on its extreme is a patch with 28 feet water over it situated 4½ cables 162° true from the beacon, and with other patches of 4 and 5 fathoms between.

An isolated rock, with 4¼ fathoms water over it, lies with the beacon bearing 220° true, distant 3¼ cables; between this rock and the 28-foot patch are two other heads with 4¼ and 4½ fathoms over them. The *red* sector of Punta Becchi (Isola Lavezzi) light and the *red* sector of Isola Razzoli light shows over Secca di Lavezzi and its detached shoals.

General charts 1131, 161b, 1780, 767, 2158a, 449.

Chart 1189, Bonifacio strait. Var. 16° W.

Clearing marks.—The Croix de la Trinité (on a conical hill north-west of Bonifacio) kept open of Capo Pertusato, 319° true, leads south-west of Secca di Lavezzi and detached shoals (*see* view on chart); and the eastern side of Isola Lavezzi in line with the highest part of Cavallo, bearing 358° true, leads eastward of them. At night, Razzoli *occulting white* light bearing 86° true will lead a long half a mile south of the rock and shoals, or keep south of the southern limit of the *red* sector, which is thrown over the rock from that light. A *red* sector of light is also (as before mentioned) thrown over the rock and shoals from Isola Lavezzi light; the navigator may therefore be sure that he is not near this danger when one of the lights is seen *white*, but should both *red* lights be seen the course must be altered immediately.

Directions from West to East. — Vessels from the westward bound to Civita Vecchia, Naples, or neighbouring ports, generally take the Bonifacio strait. Approaching the entrance to the strait, a course should be steered a little to the northward, allowing for the effect of the currents. If the wind is from the northern quarter, sailing vessels make the land at Capo Pertusato (the south extreme of Corsica), known by its whiteness, and by the light-tower on it; with the wind from the southern quarter, the island of Asinara, off the north-west point of Sardinia, recognised by its elevation and the lighthouse on its summit.

By day, on arriving off the entrance, the islets appear to form a barrier without any opening, but on a nearer approach the wide passage between the islands of Lavezzi and Razzoli will be seen, together with the stone beacon on Secca di Lavezzi. Capo Testa, on the southern side, is also a conspicuous headland, being conical and isolated, with a signal tower on the summit and lighthouse below nearer the point. *See* views facing page.

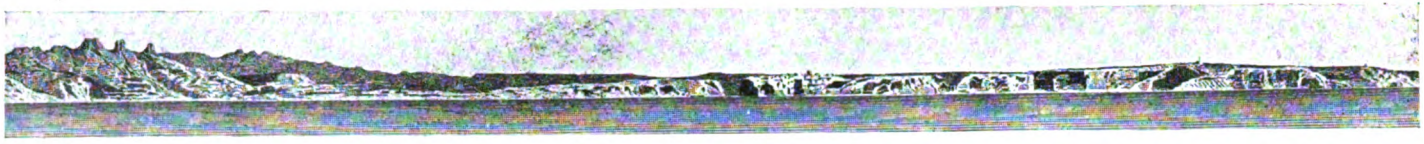
If near Capo Testa and the fog should prevent Isola Razzoli being seen, by bringing this cape to bear about 180° true, distant one mile, and steering thence 82° true, will lead about the same distance southward of Lavezzi detached shoals. On arriving off the entrance, should the wind be ahead, a sailing vessel can work to windward between the islands of Razzoli, Budelli, and Spargi, which are without dangers; the beacon sufficiently marks Secca di Lavezzi, which can be approached at a prudent distance on all sides, the northern being the shoalest. Vessels of deep draught should avoid Lavezzi detached shoals and the others already mentioned.

Steam vessels going southward generally pass through Estuario della Maddalena (*see* Caution and passage prohibited, page 647), which, although winding and in some places narrow, offers a clear deep channel with good anchorages throughout.

General charts 1131, 161b, 1780, 676, 2158a, 449.

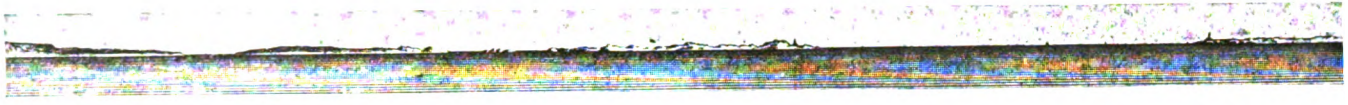
To face page 714.]

(a)



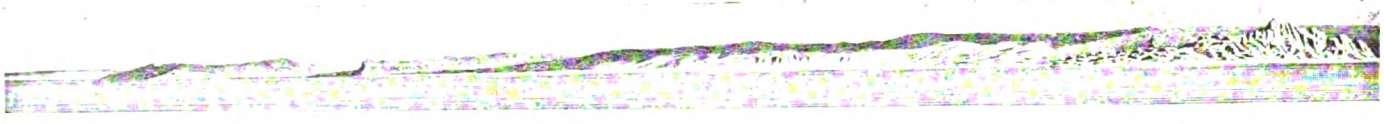
Croix de la Trinite. *Bonifacio.* *Capo Pertusato lighthouse, bearing 62° true, distant 8 miles.*

(b)



Isola Cavallo. *Lighthouse. Isola Lavezzi.* *Secca di Lavezzi lighthouse.* *Isola Razzoli lighthouse.*

(c)



Isola Spargi. Isolotto Spargiotto (in front). *Punta Falcone.* *Capo Testa lighthouse, bearing 127° true, distant 6¼ miles.*

Bonifacio strait from the westward (3 views).

Capo Figari.
Isola Tavolara
(very faint).

Isola Caprera.

Monte Congianus.

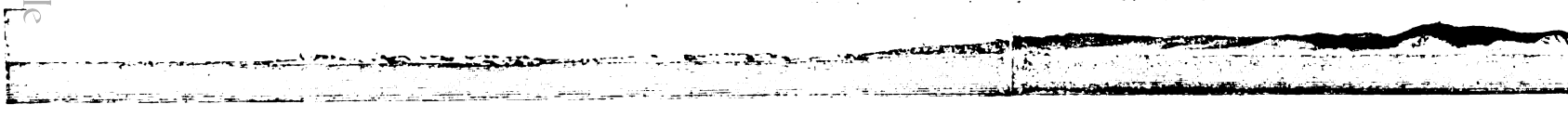
Isola Maddalena.

Guardia
Vecchia,
bearing 190° true.

Barettini and Corcelli.
Monte Cane
(behind).

Isola Santa Maria.

Isola Razzoli lighthouse.



Isola Lavezzi lighthouse,
bearing 237° true, distant 10 miles.

Isola Cavallo.

Capo Pertusato
lighthouse.

Torre di Santa Manza.

Bonifacio strait from the eastward (3 views).

Chart 1189, Bonifacio strait. Var. 10° W.

In taking this passage, the western entrance to which is between Isola Spargi and Punta Sardegna, steer to pass southward of the island to avoid Secca Corsara, with 9 feet water over it; the south-west point of Santo Stefano in line with Punta Sardegna, bearing 123° true, leads northward of Scogli Paganetto off Punta Rosso, on which there is a beacon, and leads to the southward of Secca Corsara.

The coast of Sardinia should be kept on board, to avoid the rocks between Maddalena and Santo Stefano (marked by beacons); passing through the channel between these and Sardinia, and after rounding Capo Orso, keep a little to the southward of Caprera, or with that cape just open of the south-west point of Santo Stefano bearing 300° true, and thence either north or south of Isola Biscie.

CAUTION.—The buoys and beacons are not always to be depended upon.

At night.—Approaching the strait by night, give the western side of Capo Testa a berth of 2 miles, so as to ensure passing outside the dangers which lie on the west and south-west sides of the peninsula. When Capo Testa light bears 180° true, distant about one mile, steer for Isola Razzoli light (*occulting white*) bearing about 72° true until the *fixed red* sector of light from Isola Lavezzi changes to *fixed white*, bearing 334° true when a 37° true course should lead through Bocca Grande.

If from the north-west, bring Razzoli *occulting white* light to bear 86° true before Capo Pertusato *group flashing* light bears 328° true, and steer on Razzoli light, bearing 86° true, and having passed the *red* sector of Isola Lavezzi light, steer 37° true as above. A sailing vessel working through the strait during the night should not stand to the northward beyond the southern limit of the *red* light from Razzoli, bearing about 93° true.

It must be remembered that the currents often follow the direction of the prevailing wind, and that their velocity is in proportion to its force (*see* page 717). Also that in a gale, particularly from the north-west, the sea breaks everywhere in the passages, and the currents then being very rapid much attention to the helm is necessary. In summer it often happens that while the wind is north-west at the western entrance, it is east in the eastern portion of the strait.

From east to west.—On approaching the entrance to the strait from the eastward the islands of Corsica and Sardinia appear united by a chain of islets and rocks; but if sufficiently to the northward to have Isola Lavezzi bearing less than 280° true, a clear passage will be seen.

General charts 1131, 161b, 1780, 676, 2158a, 449.

Chart 1189, Bonifacio strait. Var. 10° W.

Approaching from the southward pass to the northward of Isola Santa Maria and Isola Razzoli; but in a sailing vessel, should the wind be northerly and scant for passing to windward of these islands, the passages between the islets lying between Santa Maria and Maddalena may be used, thence to the southward of Budelli, and for the middle of the channel between Lavezzi and the coast of Sardinia. *See* views facing page.

At night.—Isola Razzoli light is obscured by the land southward of the bearing of 291° true, and until it is sighted a vessel should be careful not to enter the arc of *red* light from Capo Ferro, between the bearings of 172° true and 206° true; crossing this arc with Razzoli light just sighted will pass 1½ miles northward of Secca dei Monaci, and 2 miles northward of Isolotti Monaci.

From the northward, the channel between Isola Cavallo and Isola Perduto can be taken, or that eastward of Scoglio Perduto; in the first case take the middle of the channel, steering 202° true, and either round Isola Lavezzi at the distance of 4 cables, or go to the southward of Secca di Lavezzi, and out to the westward as before.

In passing outside Scoglio Perduto (which lie two-thirds of a mile to the south-east of the islet), keep Razzoli lighthouse bearing westward of 170° true until a mile south of Perduto, when a course of 226° true will lead well to the eastward of Secca di Lavezzi. To pass south of Secca di Lavezzi, keep Croix de la Trinité open west of Capo Pertusato bearing 319° true. There is no difficulty in working through, so long as the beacon remains or these marks are attended to.

It is by no means a rare occurrence to find the wind from the northwest on arriving at the western entrance of the strait, when previously it had been even fresh from the south-east; and should it be too fresh for a sailing vessel to work to windward, anchorage can be obtained in Rada di Mezzo Schifo (Agincourt road). *See* page 640.

Should there be signs of bad weather from the westward, it might be preferable to run along under the coast of Corsica with the south-east wind, which is often very fresh, and double Capo Corso at a good distance. If bound to the northern ports of France the passage might thus be made more quickly than by remaining at anchor until the wind admitted of clearing the strait.

At night.—As soon as Razzoli light is made, keep it bearing between 180° true and 235° true; the first bearing passes well to the eastward of Scoglio Perduto, and the latter to the northward of Isola Santa Maria; pass about a mile northward of Razzoli light, and when it bears 180° true, alter course to 242° true for Capo Testa light; this course leads a mile south of Secca Lavezzi and shoals; and when the light on Capo Pertusato bears 328° true, alter course as requisite.

General charts 1131, 161b, 1780, 676, 2158a, 449.

Chart 1189, Bonifacio strait. Var. 10° W.

With a steady favourable wind, there is no difficulty for a sailing vessel in this passage as long as the lights are seen, otherwise it would not be prudent to enter it, but rather to anchor in one of the roads on the north-east of Sardinia.

Currents in Bonifacio strait.—It has been stated previously that the currents run in the direction of the prevailing wind, and that their velocity is in proportion to the force of the wind.

Mr. A. C. Southwell, Lloyd's agent for Corsica, states the following as the results of his observations made in the months of April, May, and June, 1887, between Porto di Bonifacio and Scogli Monachi (Les Moines), which are 12 miles to the westward of the port, and from information obtained on the spot:—

The currents frequently precede the wind by a considerable amount of time, running eastward before the setting in of a westerly wind, and vice versâ, and often with much force. The navigator must not, therefore, conclude that because the weather is calm there will be no current.

In Porto di Bonifacio, Mr. Stockwell observed, at irregular intervals, a rise and fall of water, often amounting to 2 and 3 feet, and on some occasions as much as 4 feet. And he was informed that during the winter the rise is even greater, the water completely covering the quays. There is no appreciable lunar tide at any time.

Local authorities at Porto di Bonifacio state that the rise and fall of the water is a foretelling of the weather that may be expected. That a rise indicates an easterly current running in the strait before westerly winds, which will follow in a few (seldom less than four or five) hours. That the fall of water during fine weather will indicate in like manner a westerly current running before easterly winds, and that the amount of the rise and fall will indicate the force of the expected wind.

It is also observed that the water commencing to fall, while a strong westerly wind is blowing, is an indication that within a few hours the wind will subside, and if the fall continues easterly winds follow.

Mr. Southwell remarks that his own observations taken at Scogli Monachi, as well as at Porto di Bonifacio, were in confirmation of the above-mentioned rules.

Fogs are said to occur frequently in the early morning in the month of May in Bonifacio strait. *See* page 50.

General charts 1131, 161b, 1780, 676, 2158a, 449.

APPENDIX I.

PARTICULARS OF DRY DOCKS, PATENT SLIPS, &c.

Port.	Name of Dock.	Length. On Blocks.	Length. Over all.	Breadth of Entrance. H.W.O.S.	Depth at H.W.O.S. On Sill.	Depth at H.W.O.S. On Blocks.	Lifting Power.	Date Built.	Remarks.
		Feet	Feet	Feet	Feet	Feet	Tons		
Gibraltar	No. 1 (as one dock)	851¾	863	93⅔	38 7/12	38 7/12	—	1904	
	,, outer (A)	380	380	93⅔	38 7/12	38 7/12	—	—	
	,, inner (B)	451¾	463	94	41 1/12	38 7/12	—	—	
	No. 2 (C)	552	563	93⅔	38 7/12	38 7/12	—	1904	
	No. 3 (D)	450⅝	463	93⅔	38 7/12	38 7/12	—	1904	
	No. 4	251⅙	261¼	46	14 1/12	14⅓	—	1904	At King's bastion. Length on blocks can be increased to 250¾ feet by raising blocks.
	Patent Slip, No. 4	—	100	18	—	—	130	—	
	,, ,, 5	—	100	18	—	—	130	—	
	,, ,, 6	190	210	24	Forward	7½	390	—	
	,, ,, 7	190	210	24	Aft	10½			
	,, ,, 8	155½	209	24¾	Forward	7½	330	—	
					Aft	12⅔			
Cartagena	Government	430	492	90	31½	27½ Aft 29½ Frd.	—	1903	
	,, (Floating)	320	320	79	29½	26	5,500 to 6,500	1866	
	Patent Slip (Marrucos)	61 (cradle)	—	6	Forward Aft	6 6½	150	—	
Barcelona	Floating dock (Depositing)	—	367	75	23	—	6,000	1899	Built in three sections, 121 feet, 121 feet, and 126 feet long, with 18 pontoons.
1	2	3	4	5	6	7	8	9	10

1	2	3	4	5	6	7	8	9	10
Port Mahon	Floating (Pontoon) ..	450	450	85	31½	28	12,000	1900	
Oran	Patent Slip	Will take a vessel of 150 tons.							A small floating dock for torpedo boats.
Algiers.....	No. 1 (Government)	361	428	86¾	29½	27¼	—	1869	There are three careening slips, 131, 98, and 40 feet wide respectively, also a pontoon for heaving down vessels of from 150 to 200 tons.
	No. 2 ,,	220	248	72	21⅓	19	—	1864	
	Floating	—	82	23	16	8¾	200	1900	
Bizerta ..... (Sidi Abdallah)	Government No. 1 ..	—	656	90½	33½	—	—	—	There are some small floating docks at Baie Ponty.
	,, ,, 2 ..	—	295	46½	17⅓	—	—	—	
	,, ,, 3 ..	—	656	90½	33½	—	—	—	
Tunis (Goletta)	Dry dock	185	194	32	11	11	—	1892	
Malta	No. 1, outer	255 7/12 *272	255 7/12	75¾	23¼	18¼	—	—	There is a patent slip at French creek and at the Marsa.
	,, inner	270⅓	300⅓	68⅙	23¼	20	—	—	
	,, as one	535 5/8 *551¾	566 5/8 *582¾	75¾ to 68⅙	22¼	18¼	—	—	
	No. 2, Hamilton	520 *558	538½ *576½	92¾	32⅔	29 11/12	—	—	
	No. 3, Somerset	427 7/12	471⅔	78⅙	32¼	28⅔	—	—	
	No. 4, outer	420 *480	440	93¾	34¼	34 11/12	—	—	
	,, inner	330	336½	93¾	36¾	33¾	—	—	
	,, as one	790 *830	796½ *836½	93¾	34¼	34 11/12	—	—	
	No. 5	550 *590	556½ *596½	93¾	34¼	34 11/12	—	—	
	Hydraulic	345½ (211½ on pontoons)	359	62½	—	16 7/12 and 18 1/12	1,000	1871	

*Caisson in outer stop.

PARTICULARS OF DRY DOCKS, PATENT SLIPS, &c.—*continued.*

Port.	Name of Dock.	Length.		Breadth of Entrance. H.W.O.S.	Depth at H.W.O.S.		Lifting Power.	Date Built.	Remarks.
		On Blocks.	Over all.		On Sill.	On Blocks			
		Feet	Feet	Feet	Feet	Feet	Tons		
Messina	Dry dock	345	360	80	28	24	—	—	
Palermo	Dry dock	411 562*	414 565*	80	$27\frac{5}{8}$	25	—	1908	
	Patent Slip	234 (cradle)	—	36 (cradle)	Forward Aft	9 14	1,500	1871	
Maddalena	Floating dock	For torpedo boats only.							

*Caisson in outer stop.

APPENDIX II.

LIST OF PRINCIPAL PORTS, SHOWING PARTICULARS OF DEPTHS, &c.

Port.	Depth at L.W.O.S. in channel of approach.	Depth at L.W.O.S. in anchorage.	Rise of Tide.	Remarks.
Algiers.....	Northern, 11 to 12 fms. Southern 6 fms.	Harbours, 1½ to 10 fms.	Nil	
Alicante	Harbour entrance, 26 feet.	Outer, 6 to 7 fms. Inner, 4½ to 5 fms. Harbour, 20 to 26 feet.	Nil	Inner anchorage to be dredged to 26 to 35 feet and half the area of harbour to a general depth of 26 feet.
Almeria	Harbour entrance 25 feet.	Roads, 7 to 20 fms. Harbour, 3 to 6½ fms.	Nil	The harbour is subject to silt.
Aranci	Deep	8 to 13 fms.	Nil	
Augusta ..... (Porto di)	10 to 20 fms.	8 to 11 fms.	4 to 15 inches.	Rise of tide is much affected by wind.
Bizerta	In Le Canal, 33 feet. In the approach to Le Canal, 30 feet.	Rade Exterieur, 8 fms. L'Avant port, 3½ to 6 fms. Rade Interieure, 5½ to 6½ fms. Le Lac, 5 to 6 fms.	Springs 1½ feet, Neaps half a foot.	Strong westerly winds raise and similar easterly winds lower the level about half a foot.
Barcelona	Harbour entrance, 6 to 9 fms.	Roads, 14 to 20 fms. Outer harbour, 19 to 29 feet. Inner harbour, 21 to 31 feet.	Nil	
Bona	Harbour entrance, 6½ fathoms.	L'Avant port, 6½ fathoms (generally). Grande Darse, 31 feet. Petite Darse, 27 feet.	Nil	
Cagliari	Harbour entrance, 25 feet.	Roads, 6½ to 10 fms. Harbour, 21 to 27 feet.	Nil	
Cartagena	Outer, 7 to 12 fms. Inner, 5 to 5½ fms. Basin, 26 feet.	Harbour, 3½ to 7 fms. Basin, 2½ to 5½ fms.	Nil	The harbour is being dredged to a minimum depth of 28 feet.

LIST OF PRINCIPAL PORTS, SHOWING PARTICULARS OF DEPTHS, &c. —*continued.*

Port.	Depth at L.W.O.S. in channel of approach.	Depth at L.W.O.S. in anchorage.	Rise of Tide.	Remarks.
Catania	Harbour entrance, 5 to 8 fms.	L'Avamporto, 4 to 8 fms. Porto Nuovo, 3¼ to 8 fms. Porto Vecchio, 22 to 27 feet.	3 to 12 inches.	The tides are influenced by the winds.
Gibraltar.....	Northern entrance to harbour, 5½ to 9 fms. Southern entrance, 8 and 9 fms except close to mole heads.	Roads, 15 to 25 fms.	Springs, 3¼ feet. Neaps, 2½ feet.	Strong gales sometimes cause the water to rise considerably above the usual level.
Maddalena	6 to 8 fms.	5 to 12 fms. 8 to 20 fms. in Rada di San Stefano.	Nil	
Malaga	Harbour entrance— Outer, 6 to 8 fms. Inner, 4¼ to 4½ fms.	Outer harbour, 4¼ to 7 fms. Inner 28 feet.	Springs, 3 feet.	With strong winds from east to south the water rises about 6 feet above the usual level.
Malta	10 to 12 fms.	Grand harbour, 5 to 13 fms. Marsa Musciet, 12 to 16 fms.	Springs, 10 to 14 inches (approximately)	
Mars el-Kebir..	Deep	8 to 17 fms.	Nil	
Messina	Harbour entrance, 30 fms.	Harbour, 10 to 36 fms.	No regular.	
Oran	Harbour entrance, 6 fms.	L'Avant port, 3 to 8 fms. Vieux port, 3¼ to 3¾ fms.	Nil	Westerly winds raise the level of the water in the port; easterly winds lower it, the difference between the two levels amounts to about 2 feet.
Palermo	Harbour entrance, 8 to 10 fms.	Harbour, 3¼ to 8 fms. Porto Felice, 3½ to 4 fms.	Nil	
Palma	Harbour entrance, 24 feet.	Harbour, 13 to 26 feet. Roads, 7 to 8 fms.	Nil	

LIST OF PRINCIPAL PORTS, SHOWING PARTICULARS OF DEPTHS, &c. —*continued.*

Port.	Depth at L.W.O.S. in channel of approach.	Depth at L.W.O.S. in anchorage.	Rise of Tide.	Remarks.
Philippeville ..	Harbour entrance, 6 to 7 fms.	L'Avant port, 6 feet to 9 fms. La Darse, 23 feet.	Nil	
Port Alfaques	3¾ to 4 fms.	3¾ fms.	Nil	
Port Mahon ..	6½ to 9 fms.	Outer, 14 to 23 fms. Inner, 6 to 14 and 8 to 11 fms.	No regular.	Winds affect water level; no room in the port for longer vessels than *Cornwall* class.
Tangier	8 fms.	7 fms.	Spring, 8¼ feet. Neaps, 5 feet.	
Tarragona	Harbour entrance 26 to 30 feet.	Outer harbour, 12 to 22 feet. Inner harbour, 24 to 30 feet.	Nil	A depth of 29 feet can be carried into the Inner harbour.
Terranova	24 to 29 feet, 19 feet in channel, to town and Porto Romano.	22 to 28 feet, 20 feet off town, 20 to 25 feet in Porto Romano.	Nil	
Tunis	21 feet	Harbour, 21 feet.	Springs about 3 feet.	
Valencia ..... (Port of Grao)	26 feet	Outer port, 26 to 50 feet. Basin No. 1, 12 to 27 feet. Basin No. 2, 28½ feet. Basin No. 3. 25½ feet.	Nil	

APPENDIX III.

PLACE—GIBRALTAR. OBS. △. LAT. 36° 6′ N., LONG. 5° 21′ W. *Height above M.S.L., 46 feet.*

METEOROLOGICAL TABLE COMPILED FROM 24 TO 30 YEARS' OBSERVATIONS.

Month.	Barometer at 32° F. and Mean Sea Level.	AIR TEMPERATURE (Fahr.)							Relative Humidity.	Cloud Amount. Scale 0 to 10.	RAIN.			WIND.										Fog.*
		Mean.				Absolute.								Mean Force, Beaufort Scale.	Number of Days from									
	Mean.	For Month.	Max.	Min.	Range.	Max.	Min.	Range.			Total Fall.	No. of Days.	Max. Fall in 24 hours.		N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	
	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.											
January	30·17	56	62	50	12	74	33	41	77	5	5·09	7	5·06	—	2	3	9	1	1	3	6	6	0	—
February	30·12	56	62	50	12	81	33	48	77	5	4·28	11	4·18	—	1	3	8	1	1	3	6	5	0	2
March	30·04	58	64	52	12	77	40	37	79	5	7·78	11	4·11	—	1	2	10	1	1	3	7	5	1	4
April	30·04	63	70	55	15	87	45	42	75	5	4·89	8	2·29	—	1	2	7	1	1	4	9	4	1	4
May	30·01	67	74	59	15	89	49	40	73	4	2·70	7	2·19	—	1	2	10	1	1	3	8	4	1	1
June	30·06	72	80	63	17	94	49	45	71	3	1·40	2	0·55	—	0	3	10	1	1	4	8	2	1	4
July	30·04	76	84	67	17	100	57	43	71	2	0·40	1	0·03	—	0	4	11	1	1	3	8	2	1	13
August	30·02	77	85	69	16	100	57	43	73	3	1·70	1	0·18	—	1	4	13	1	1	3	8	2	1	26
September	30·06	73	80	66	14	94	50	44	75	4	5·70	3	1·34	—	1	4	11	1	1	2	6	3	1	7
October	30·05	67	73	60	13	95	44	51	78	5	3·10	7	2·45	—	1	3	11	1	1	3	7	3	1	3
November	30·05	61	66	56	10	79	41	38	79	5	6·50	10	5·98	—	2	4	8	1	1	3	7	4	0	1
December	30·12	57	62	51	11	77	30	47	78	5	6·90	12	6·07	—	2	3	9	1	1	3	5	7	0	—
Means	30·07	65	72	58	14	—	—	—	76	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	49·93	80	—	—	13	37	117	12	12	37	82	47	8	65
Absolute Values	—	—	—	—	—	100	30	70	—	—	—	—	6·07	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obs.	24	30													26									12

*The observations on which these are based cannot be considered as attaining to the accuracy of Meteorological records; but may merely indicate the intervals during which the signals at Europa point have been in operation.

PLACE—CARTAGENA. OBS. △. LAT. 37° 36′ N., LONG. 0° 47′ W. *Height above M.S.L.*, 43 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 4 TO 31 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	RAIN. No. of Days.	RAIN. Max. Fall in 24 hours.	WIND. Mean Force. Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·09	—	30·88	29·16	1·72	52	59	43	16	80	28	52	74	—	1·77	5	2·84	—	10	3	0	1	2	8	4	3	—	0·5	1·2
February	30·06	—	30·69	29·26	1·43	54	61	45	16	84	31	53	73	—	1·39	4	2·52	—	6	4	0	1	1	10	4	2	—	0·3	2·0
March	29·99	—	30·49	29·24	1·25	56	63	47	16	83	31	52	72	—	1·63	6	1·62	—	7	5	2	2	2	9	2	2	—	0·4	1·0
April	29·94	—	30·36	29·17	1·19	62	67	52	15	95	39	56	69	—	1·06	4	1·97	—	4	1	1	1	4	12	4	3	—	0·3	0·3
May	29·95	—	30·36	29·42	0·94	65	71	56	15	96	41	55	71	—	1·01	3	2·72	—	4	7	2	1	5	8	1	3	—	0·3	0·3
June	30·01	—	30·28	29·61	0·67	72	78	62	16	99	51	48	70	—	0·80	2	3·31	—	3	8	2	3	3	8	1	2	—	0·2	0·2
July	30·00	—	30·30	29·48	0·82	77	83	68	15	104	57	47	69	—	0·07	1	0·39	—	1	12	5	2	3	7	0	1	—	0·3	0·0
August	30·00	—	30·32	29·59	0·73	78	84	68	16	104	57	47	70	—	2·28	1	0·91	—	3	7	5	4	6	6	0	0	—	0·2	0·2
September	30·02	—	30·40	29·59	0·81	74	80	65	15	101	48	53	72	—	1·36	3	4·17	—	5	10	6	1	2	4	1	1	—	0·3	0·2
October	29·99	—	30·45	29·31	1·14	67	73	58	15	94	40	54	71	—	1·66	4	3·78	—	8	7	2	2	1	9	1	1	—	0·3	0·3
November	30·03	—	30·53	29·38	1·15	60	66	51	15	85	32	53	74	—	1·89	5	2·68	—	8	6	1	1	1	9	2	2	—	0·3	0·5
December	30·08	—	30·56	29·38	1·18	53	61	44	17	79	30	49	73	—	2·06	5	2·60	—	10	6	1	0	1	10	2	1	—	0·4	0·8
Means	30·01	—	—	—	—	64	71	55	16	—	—	—	72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16·98	43	—	—	69	76	27	19	31	100	22	21	—	3·8	7·0
Absolute Values	—	—	30·88	29·16	1·72	—	—	—	—	104	28	76	—	—	—	—	4·17	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	31	—	24			31	20			24				—	20			—	4								—	24	

Authorities :—{ "Observaciones Meteorológicas de Provincias" (Spain). "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—BARCELONA. OBS. △. LAT. 41° 22′ N., LONG. 2° 9′ E. *Height above M.S.L., 70 feet.*

METEOROLOGICAL TABLE COMPILED FROM 11 TO 31 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount, Scale 0 to 10.	RAIN. Total Fall.	RAIN. No. of Days.	RAIN. Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·07	—	30·83	29·11	1·72	48	55	39	16	78	15	63	68	—	1·42	5	2·28	—	2	4	3	1	2	5	10	4	—	0·8	4·0
February	30·05	—	30·77	29·12	1·65	50	58	42	16	74	25	49	69	—	1·37	5	2·05	—	1	3	2	2	4	7	6	3	—	0·7	2·2
March	29·96	—	30·66	29·28	1·38	54	60	44	16	76	25	51	68	—	1·82	6	1·85	—	1	3	5	4	6	8	3	1	—	0·8	1·4
April	29·92	—	30·47	29·11	1·36	57	65	49	16	81	35	46	67	—	1·73	8	1·73	—	1	2	5	5	5	7	4	1	—	0·8	0·7
May	29·97	—	30·44	29·24	1·20	63	71	53	18	85	39	46	67	—	1·37	7	1·34	—	0	2	7	5	6	8	2	1	—	0·3	0·3
June	30·01	—	30·42	29·58	0·84	69	78	60	18	90	46	44	66	—	1·32	5	1·69	—	0	1	6	7	9	6	1	0	—	0·1	0·2
July	30·02	—	30·44	29·69	0·75	75	83	66	17	99	48	51	66	—	1·04	3	3·86	—	0	1	6	7	10	6	1	0	—	0·2	0·1
August	30·01	—	30·32	29·40	0·92	76	83	66	17	97	48	49	68	—	1·44	4	2·68	—	0	1	5	8	10	6	1	0	—	0·2	0·3
September	30·04	—	30·49	29·53	0·96	70	78	62	16	91	42	49	70	—	3·29	7	4·06	—	1	4	6	6	6	6	1	0	—	0·1	0·6
October	29·98	—	30·54	29·28	1·26	65	70	54	16	88	33	55	70	—	2·89	8	2·56	—	1	4	5	4	4	7	5	1	—	0·5	0·7
November	30·00	—	30·55	29·19	1·36	55	61	47	14	78	24	54	71	—	1·82	7	2·80	—	2	3	3	2	3	4	8	5	—	0·4	2·3
December	30·04	—	30·78	29·04	1·74	48	56	41	15	70	20	44	69	—	1·23	5	1·06	—	4	4	1	0	1	4	9	8	—	0·4	3·1
Means	30·01	—	—	—	—	61	68	52	16	—	—	—	68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20·74	70	—	—	13	32	54	51	66	74	51	24	—	5·3	15·9
Absolute Values	—	—	30·83	20·04	1·79	—	—	—	—	99	15	84	—	—	—	—	4·06	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	31	—	30			31	20			30							20	—	11									30	

Authorities :—{ "Observaciones Meteorológicas de Provincias (Spain).
"Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—PALMA. OBS. △. LAT. 39° 33′ N., LONG. 2° 37′ E. *Height above M.S.L.*, 66 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 11 TO 31 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January - -	30·06	—	30·80	29·13	1·67	51	58	44	14	72	26	46	79	—	1·88	9	2·25	—	5	5	1	1	2	7	3	7	—	1·8	0·4
February - -	30·04	—	30·64	29·24	1·40	53	61	46	15	74	28	46	77	—	1·37	6	1·18	—	4	4	1	1	4	8	3	3	—	2·4	0·5
March - - -	29·96	—	30·54	29·26	1·28	56	64	48	16	82	31	51	75	—	1·59	7	2·36	—	3	5	2	1	5	10	2	3	—	3·0	1·0
April - - -	29·92	—	30·36	29·25	1·11	60	68	51	17	84	39	45	73	—	1·43	7	1·69	—	2	4	2	1	6	10	2	3	—	2·3	0·2
May - - -	29·95	—	30·32	29·24	1·08	65	74	56	18	93	43	50	72	—	1·41	5	1·62	—	1	4	2	1	8	12	1	2	—	1·1	0·2
June - - -	30·02	—	30·35	29·57	0·78	72	81	62	19	100	50	50	71	—	0·66	3	1·30	—	1	3	2	1	8	14	0	1	—	1·0	0·0
July - - -	30·04	—	30·38	29·67	0·71	78	87	68	19	102	56	46	70	—	0·47	2	1·22	—	1	3	2	1	9	14	0	1	—	0·5	0·0
August - - -	30·03	—	30·37	29·55	0·82	79	87	69	18	102	56	46	72	—	0·76	2	4·65	—	1	2	1	1	11	13	1	1	—	0·4	0·0
September - -	30·05	—	30·43	29·59	0·84	75	83	66	17	98	52	46	76	—	1·90	6	2·13	—	2	4	2	0	6	13	1	2	—	0·4	0·0
October - -	29·99	—	30·48	29·31	1·17	67	75	59	16	94	40	54	78	—	2·73	8	2·36	—	3	5	2	0	4	10	2	5	—	1·4	0·1
November - -	30·00	—	30·51	29·27	1·24	59	66	53	13	83	39	44	80	—	2·30	9	1·81	—	5	4	1	1	1	7	5	6	—	1·8	0·3
December - -	30·04	—	30·71	29·09	1·62	52	60	46	14	79	32	47	79	—	2·36	8	1·85	—	8	4	1	1	2	5	4	6	—	2·0	0·4
Means - - -	30·01	—	—	—	—	64	72	56	16	—	—	—	75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals - - -	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18·86	72	—	—	36	47	19	10	66	123	24	40	—	18·1	3·1
Absolute Values -	—	—	30·80	29·09	1·71	—	—	—	—	102	26	76	—	—	—	—	4·65	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	31	—	25			31	20			25							20	—	11									25	

Authorities :—{ "Observaciones Meteorológicas de Provincias" (Spain). "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—PORT MAHON. OBS. △. LAT. 39° 53′ N., LONG. 4° 21′ E. *Height above M.S.L.*, 141 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 13 TO 14 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·09	—	30·78	29·20	1·58	50	55	46	9	68	28	40	78	—	2·40	10	2·68	—	—	—	—	—	—	—	—	—	—	3·0	0·5
February	30·08	—	30·62	29·37	1·25	51	57	46	11	68	30	38	77	—	1·76	6	2·01	—	—	—	—	—	—	—	—	—	—	2·4	2·1
March	30·00	—	30·52	29·32	1·20	53	59	47	12	75	33	42	76	—	1·82	8	1·85	—	—	—	—	—	—	—	—	—	—	3·3	0·6
April	30·00	—	30·51	29·22	1·29	57	63	51	12	77	39	38	72	—	1·34	5	2·09	—	—	—	—	—	—	—	—	—	—	2·2	0·6
May	30·01	—	30·42	29·37	1·05	62	69	56	13	84	43	41	69	—	1·61	7	2·01	—	—	—	—	—	—	—	—	—	—	1·2	0·9
June	30·08	—	30·37	29·47	0·90	70	77	63	14	91	51	40	65	—	0·88	3	2·56	—	—	—	—	—	—	—	—	—	—	0·6	0·6
July	30·08	—	30·35	29·72	0·63	75	81	68	13	96	57	39	62	—	0·91	2	3·39	—	—	—	—	—	—	—	—	—	—	0·7	0·5
August	30·09	—	30·41	29·74	0·67	75	81	69	12	95	57	38	63	—	0·77	3	1·34	—	—	—	—	—	—	—	—	—	—	0·9	0·2
September	30·10	—	30·47	29·76	0·71	72	78	67	11	93	53	40	69	—	1·93	5	4·92	—	—	—	—	—	—	—	—	—	—	1·0	0·6
October	30·05	—	30·54	29·36	1·18	66	71	60	11	82	43	39	73	—	4·16	11	3·94	—	—	—	—	—	—	—	—	—	—	1·9	0·7
November	30·06	—	30·62	29·29	1·33	59	64	54	10	77	39	38	78	—	4·44	12	2·64	—	—	—	—	—	—	—	—	—	—	1·9	0·5
December	30·11	—	30·58	28·88	1·70	52	55	49	6	66	33	33	77	—	3·31	10	1·93	—	—	—	—	—	—	—	—	—	—	2·9	0·1
Means	30·06	—	—	—	—	62	67	56	11	—	—	—	72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25·33	82	—	—	—	—	—	—	—	—	—	—	—	22·0	7·9
Absolute Values	—	—	30·78	28·88	1·90	—	—	—	—	96	28	68	—	—	—	—	4·92	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	14					13				14			13	—	14	13	14	—	—	—	—	—	—	—	—	—	—	14	

Authority :—" Observaciones Meteorológicas de Provincias " (Spain).

Meteorological Office,
October, 1912.

PLACE—ORAN. OBS. △. LAT. 35° 42′ N., LONG. 0° 39′ W. *Height above M.S.L.*, 197 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 13 TO 36 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	RAIN. No. of Days.	RAIN. Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·14	—	30·65	29·58	1·07	54	61	45	16	76	31	45	77	3	3·02	9	2·50	2	9	0	1	1	11	2	1	4	2	—	—
February	30·11	—	30·58	29·26	1·32	55	64	46	18	85	34	51	77	3	2·04	6	3·17	2	9	0	0	1	10	2	2	3	1	—	—
March	30·01	—	30·52	29·10	1·42	58	66	50	16	82	34	48	75	3	2·19	8	1·00	2	11	1	0	1	9	3	2	3	1	—	—
April	29·98	—	30·44	29·54	0·90	62	70	53	17	95	42	53	73	3	1·31	6	1·17	2	11	0	0	1	9	2	1	5	1	—	—
May	30·00	—	30·38	29·59	0·79	66	74	58	16	93	44	49	72	3	0·87	9	1·29	2	12	0	0	1	7	2	2	4	3	—	—
June	30·01	—	30·33	29·65	0·68	72	79	64	15	97	52	45	71	2	0·28	3	0·78	2	12	0	0	1	7	1	2	5	2	—	—
July	30·00	—	30·30	29·79	0·51	77	84	69	15	110	58	52	73	2	0·03	1	0·18	2	14	0	0	1	6	1	2	5	2	—	—
August	30·00	—	30·26	29·74	0·52	77	85	69	16	100	57	43	75	2	0·09	1	0·89	2	15	0	0	1	6	1	1	5	2	—	—
September	30·02	—	30·35	29·60	0·75	74	81	66	15	99	55	44	76	3	0·49	5	1·05	2	14	0	0	1	6	1	2	5	1	—	—
October	30·02	—	30·40	29·61	0·79	68	75	60	15	93	44	49	76	3	1·23	6	1·67	2	11	0	0	1	9	2	1	6	1	—	—
November	30·04	—	30·55	29·23	1·32	60	68	53	15	89	37	52	76	3	2·23	8	2·76	2	9	1	0	1	10	2	2	4	1	—	—
December	30·10	—	30·56	29·34	1·22	55	63	47	16	77	35	42	78	3	2·35	9	2·05	2	8	0	0	2	13	3	1	3	1	—	—
Means	30·04	—	—	—	—	65	73	57	16	—	—	—	75	3	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16·13	71	—	—	135	2	1	13	103	22	19	52	18	—	—
Absolute Values	—	—	30·65	29·10	1·55	—	—	—	—	110	31	79	—	—	—	—	3·17	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	35	—	13			36	21						13		21		13	21										—	—

Authorities :—{ "Annales du Bureau Central Météorologique de France." "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—ALGIERS. OBS. △. LAT. 36° 47′ N., LONG. 3° 4′ E. *Height above M.S.L.*, 126 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 18 TO 34 YEARS' OBSERVATIONS.

MONTH.	BAROMETER. Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force. Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·11	—	30·67	29·29	1·38	55	61	49	12	82	28	54	64	5	4·10	15	2·27	4	4	2	3	2	2	5	8	5	0	—	—
February	30·08	—	30·73	29·36	1·37	56	64	50	14	87	36	51	64	5	2·58	13	1·09	5	4	3	3	1	1	4	7	5	0	—	—
March	29·98	—	30·46	29·12	1·34	58	68	52	16	88	38	50	64	5	3·45	14	2·86	5	5	4	3	2	1	3	8	5	0	—	—
April	29·95	—	30·42	29·33	1·09	62	69	55	14	95	43	52	64	5	2·10	10	2·24	5	4	3	5	2	1	3	7	5	0	—	—
May	29·98	—	30·42	29·40	1·02	66	74	60	14	100	50	50	64	4	1·54	9	2·38	4	6	5	6	1	1	2	5	5	0	—	—
June	30·00	—	30·26	29·66	0·60	72	80	65	15	109	56	53	62	3	0·43	5	1·52	4	6	7	5	2	1	2	4	3	0	—	—
July	30·00	—	30·24	29·69	0·55	77	85	70	15	112	61	51	66	3	0·17	3	0·54	4	8	8	6	2	1	1	2	3	0	—	—
August	29·98	—	30·23	29·73	0·50	78	86	71	15	112	63	49	68	3	0·15	3	0·46	4	7	7	7	1	1	2	2	4	0	—	—
September	30·01	—	30·30	29·62	0·68	75	84	69	15	110	58	52	67	4	0·93	8	1·88	4	7	6	6	2	1	1	3	4	0	—	—
October	30·00	—	30·40	29·39	1·01	69	77	64	13	103	46	57	66	5	2·89	11	2·56	4	5	5	5	1	1	3	6	5	0	—	—
November	30·02	—	30·51	29·22	1·29	62	70	57	13	92	40	52	67	5	4·56	14	3·18	4	4	2	3	2	2	5	8	4	0	—	—
December	30·07	—	30·54	29·31	1·23	56	63	51	12	77	39	38	67	5	4·56	15	2·51	4	3	2	3	2	2	5	9	5	0	—	—
Means	30·02	—	—	—	—	66	73	59	14	—	—	—	65	4	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	27·46	120	—	—	63	54	55	20	15	36	69	53	0	—	—
Absolute Values	—	—	30·73	29·12	1·61	—	—	—	—	112	28	84	—	—	—	—	3·18	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	34	—	18			34	19							18	19			25										—	—

Authorities :— { "Annales du Bureau Central Météorologique de France." "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—BIZERTA. OBS. △. LAT. 37° 17′ N., LONG. 9° 50′ E. *Height above M.S.L.*, 30 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 17 TO 19 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	RAIN. No. of Days.	RAIN. Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·06	—	30·67	29·28	1·39	52	59	45	14	75	32	43	75	5	1·36	14	2·15	4	2	2	1	3	2	8	5	8	0	—	—
February	30·04	—	30·70	28·89	1·81	54	60	47	13	77	33	44	74	5	2·85	11	3·27	5	3	1	1	2	2	5	5	9	0	—	—
March	29·96	—	30·55	29·03	1·52	56	64	49	15	89	34	55	73	4	2·58	11	1·53	5	2	3	2	2	2	5	5	10	0	—	—
April	29·95	—	30·51	29·35	1·16	60	67	53	14	88	40	48	71	4	1·84	10	1·69	5	2	3	2	2	1	4	5	11	0	—	—
May	29·97	—	30·37	29·39	0·98	66	73	58	15	99	45	54	68	4	1·16	7	1·18	4	4	3	2	1	1	4	5	10	1	—	—
June	30·01	—	30·27	29·56	0·71	72	80	65	15	102	53	49	65	3	0·53	3	2·36	4	3	4	3	1	1	3	4	10	1	—	—
July	30·01	—	30·25	29·73	0·52	77	85	70	15	109	60	49	66	2	0·20	2	0·67	4	3	4	3	1	1	3	4	11	1	—	—
August	30·02	—	30·30	29·74	0·56	79	86	71	15	111	58	53	66	2	0·12	2	0·45	4	3	4	4	2	1	2	3	11	1	—	—
September	30·03	—	30·35	29·64	0·71	77	84	69	15	108	58	50	68	3	0·78	5	1·09	3	3	3	4	3	2	2	4	8	1	—	—
October	30·01	—	30·45	29·48	0·97	69	77	62	15	102	42	60	70	4	2·54	10	5·26	3	3	2	3	2	2	6	4	8	1	—	—
November	30·03	—	30·58	29·24	1·34	62	69	55	14	86	41	45	73	5	3·62	13	2·23	4	2	2	1	2	3	8	5	6	1	—	—
December	30·03	—	30·57	29·22	1·35	55	60	49	11	73	35	38	75	5	4·94	16	3·49	4	2	2	1	2	2	8	4	9	1	—	—
Means	30·01	—	—	—	—	65	72	58	14	—	—	—	70	4	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25·52	104	—	—	32	33	27	23	20	58	53	111	8	—	—
Absolute Values	—	—	30·70	28·89	1·81	—	—	—	—	111	32	79	—	—	—	—	5·26	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	19	—	18			19							17	18	19		18	19										—	—

Authority :—" Annales du Bureau Central Météorologique de France."

Meteorological Office,
October, 1912.

PLACE—TUNIS. OBS. △. LAT. 36° 48′ N., LONG. 10° 10′ E. *Height above M.S.L.*, 141 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 10 TO 24 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	RAIN. No. of Days.	RAIN. Max. Fall in 24 hours.	WIND. Mean Force. Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·09	—	—	—	—	50	59	43	16	84	31	53	74	—	1·83	11	—	—	4	1	2	1	2	2	5	13	1	—	—
February	30·05	—	—	—	—	52	61	43	18	80	33	47	73	—	1·81	10	—	—	2	2	1	2	2	1	5	13	0	—	—
March	29·97	—	—	—	—	55	66	46	20	91	34	57	71	—	2·16	11	—	—	2	1	2	4	4	2	5	11	0	—	—
April	29·92	—	—	—	—	59	71	50	21	104	39	65	68	—	1·60	9	—	—	2	2	1	4	3	2	5	11	0	—	—
May	29·97	—	—	—	—	64	77	55	22	103	42	61	64	—	1·06	6	—	—	4	2	2	3	3	1	4	12	0	—	—
June	30·00	—	—	—	—	73	86	62	24	108	50	58	59	—	0·50	3	—	—	3	3	3	3	2	2	2	12	0	—	—
July	30·00	—	—	—	—	79	93	67	26	109	50	59	52	—	0·16	1	—	—	3	5	5	2	2	1	4	9	0	—	—
August	29·99	—	—	—	—	79	93	66	27	117	52	65	59	—	0·38	1	—	—	5	6	6	1	1	1	3	8	0	—	—
September	30·02	—	—	—	—	75	87	64	23	106	52	54	66	—	0·81	4	—	—	4	5	6	3	2	1	3	6	0	—	—
October	30·01	—	—	—	—	66	78	57	21	104	40	64	70	—	1·69	9	—	—	3	2	2	4	3	2	6	9	0	—	—
November	30·01	—	—	—	—	59	69	49	20	90	36	54	73	—	2·14	10	—	—	4	2	2	3	2	3	3	11	0	—	—
December	30·02	—	—	—	—	53	61	44	17	75	34	41	75	—	2·88	11	—	—	3	1	1	2	3	2	8	11	0	—	—
Means	30·00	—	—	—	—	64	75	54	21	—	—	—	67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17·02	86	—	—	39	32	33	32	29	20	53	126	1	—	—
Absolute Values	—	—	—	—	—	—	—	—	—	117	31	86	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	24	—	—	—	—	15	10			11				—	16	12	—	—	12									—	—

Authorities :—{ "Annales du Bureau Central Météorologique de France." "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—SUSA. OBS. △. LAT. 35° 50′ N., LONG. 10° 39′ E.

METEOROLOGICAL TABLE COMPILED FROM 1 TO 11 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force. Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	—	—	—	—	—	55	—	—	—	80	37	43	—	—	1·90	8	—	—	—	—	—	—	—	—	—	—	—	—	—
February	—	—	—	—	—	57	—	—	—	77	38	39	—	—	1·23	4	—	—	—	—	—	—	—	—	—	—	—	—	—
March	—	—	—	—	—	59	—	—	—	75	41	34	—	—	0·93	5	—	—	—	—	—	—	—	—	—	—	—	—	—
April	—	—	—	—	—	67	—	—	—	97	41	56	—	—	0·97	7	—	—	—	—	—	—	—	—	—	—	—	—	—
May	—	—	—	—	—	67	—	—	—	98	50	48	—	—	1·14	7	—	—	—	—	—	—	—	—	—	—	—	—	—
June	—	—	—	—	—	75	—	—	—	106	55	51	—	—	0·52	4	—	—	—	—	—	—	—	—	—	—	—	—	—
July	—	—	—	—	—	77	—	—	—	93	61	32	—	—	0·15	1	—	—	—	—	—	—	—	—	—	—	—	—	—
August	—	—	—	—	—	80	—	—	—	97	63	34	—	—	0·14	2	—	—	—	—	—	—	—	—	—	—	—	—	—
September	—	—	—	—	—	78	—	—	—	102	64	38	—	—	1·43	5	—	—	—	—	—	—	—	—	—	—	—	—	—
October	—	—	—	—	—	72	—	—	—	101	52	49	—	—	1·67	7	—	—	—	—	—	—	—	—	—	—	—	—	—
November	—	—	—	—	—	64	—	—	—	82	48	34	—	—	1·24	6	—	—	—	—	—	—	—	—	—	—	—	—	—
December	—	—	—	—	—	56	—	—	—	68	46	22	—	—	1·41	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Means	—	—	—	—	—	67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12·73	57	—	—	—	—	—	—	—	—	—	—	—	—	—
Absolute Values	—	—	—	—	—	—	—	—	—	106	37	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	—	—	—	—	—	5	—	—	—	1 (1900)			—	—	11	2	—	—	—	—	—	—	—	—	—	—	—	—	—

Authority :—" Annales du Bureau Central Météorologique de France."

Meteorological Office,
October, 1912.

PLACE—MALTA. OBS. △. LAT. 35° 54′ N., LONG. 14° 30′ E. *Height above M.S.L., 70 feet.*

METEOROLOGICAL TABLE COMPILED WITH FROM 16 TO 30 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·01	—	—	—	—	56	60	52	8	76	39	37	74	6	3·12	13	2·20	—	2	5	1	4	1	5	2	10	1	—	—
February	30·00	—	—	—	—	56	60	51	9	72	34	38	76	5	1·93	9	3·13	—	1	5	1	4	1	4	2	9	1	—	—
March	29·91	—	—	—	—	57	62	52	10	83	37	46	73	5	1·76	9	2·86	—	1	5	2	4	1	3	3	11	1	—	—
April	29·91	—	—	—	—	62	66	58	8	93	44	49	74	5	0·71	5	1·50	—	1	5	2	5	1	3	2	11	0	—	—
May	29·94	—	—	—	—	66	72	61	11	89	49	40	72	4	0·25	3	0·90	—	2	6	3	5	1	2	2	9	1	—	—
June	29·95	—	—	—	—	74	79	68	11	99	58	41	68	3	0·06	1	0·30	—	2	8	2	4	0	1	2	10	1	—	—
July	29·95	—	—	—	—	78	84	73	11	103	63	40	64	1	0·06	1	0·63	—	3	8	1	3	0	1	1	13	1	—	—
August	29·94	—	—	—	—	80	85	74	11	101	65	36	66	2	0·14	1	1·22	—	3	8	1	3	1	1	1	12	1	—	—
September	29·99	—	—	—	—	76	82	71	11	100	57	43	68	4	1·40	3	4·83	—	2	7	2	5	1	3	1	9	0	—	—
October	29·98	—	—	—	—	71	76	66	10	94	45	49	71	5	2·56	7	5·545	—	1	6	2	6	1	3	2	10	0	—	—
November	29·96	—	—	—	—	65	69	60	9	81	42	39	72	5	3·42	11	3·50	—	1	5	1	5	1	3	2	11	1	—	—
December	29·98	—	—	—	—	58	63	54	9	75	42	33	74	6	3·83	13	7·77	—	1	4	1	4	1	5	3	11	1	—	—
Means	29·96	—	—	—	—	67	72	62	10	—	—	—	71	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19·24	76	—	—	20	72	19	52	10	34	23	126	9	—	—
Absolute Values	—	—	—	—	—	—	—	—	—	103	34	69	—	—	—	—	7·77	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	30	—	—	—	—	30												—	26									—	—

Authority :—" Observations at R. E. and A. M. D. Stations, 1852-1886."

Meteorological Office,
October, 1912.

PLACE—SYRACUSE. OBS. △. LAT. 37° 3′ N., LONG. 15° 15′ E. *Height above M.S.L., 77 feet.*

METEOROLOGICAL TABLE COMPILED FROM 16 TO 28 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January - -	30·02	—	30·62	29·16	1·46	52	57	46	11	73	34	39	71	6	3·74	11	5·20	—	2	5	3	2	1	5	9	3	1	—	—
February - -	30·02	—	30·60	29·38	1·22	53	58	46	12	69	32	37	71	6	2·63	9	4·24	—	2	6	3	2	1	5	6	2	1	—	—
March - - -	29·96	—	30·46	29·31	1·15	55	61	49	12	78	37	41	70	6	1·62	8	2·66	—	2	6	3	3	2	5	6	2	2	—	—
April - - -	29·91	—	30·49	29·31	1·18	59	66	53	13	80	42	38	74	6	1·54	6	2·13	—	1	7	3	3	2	5	6	2	1	—	—
May - - -	29·95	—	30·33	29·50	0·83	65	72	58	14	88	47	41	70	5	0·81	5	0·89	—	3	9	4	3	2	4	3	2	1	—	—
June - - -	29·98	—	30·23	29·60	0·63	73	80	65	15	97	55	42	71	3	0·21	2	1·02	—	3	8	4	3	3	4	2	1	2	—	—
July - - -	29·95	—	30·18	29·58	0·60	79	86	71	15	104	55	49	64	1	0·30	1	0·32	—	3	9	4	2	3	5	2	1	2	—	—
August - - -	29·95	—	30·24	29·68	0·56	80	86	72	14	105	54	51	67	2	0·28	2	0·87	—	3	9	3	4	3	4	2	1	2	—	—
September - -	30·02	—	30·34	29·50	0·84	75	82	68	14	102	56	46	70	4	1·91	5	2·72	—	2	7	3	3	2	5	4	2	2	—	—
October - -	30·01	—	30·41	29·39	1·02	68	74	62	12	91	46	45	72	6	3·66	9	2·88	—	2	6	3	3	3	5	5	2	2	—	—
November - -	30·01	—	30·55	29·43	1·12	60	66	55	11	82	42	40	72	6	4·29	10	6·77	—	2	6	2	2	1	5	7	3	2	—	—
December - -	29·99	—	30·62	29·22	1·40	55	60	48	12	70	34	36	70	6	4·12	12	2·28	—	2	6	2	2	1	5	8	3	2	—	—
Means - - -	29·98	—	—	—	—	65	71	58	13	—	—	—	70	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals - - -	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25·11	80	—	—	27	84	37	32	24	57	60	24	20	—	—
Absolute Values -	—	—	30·62	29·16	1·46	—	—	—	—	105	32	73	—	—	—	—	6·77	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	28	—	19			28	16			19					26			19										—	—

Authorities :— { "Annali dell' Ufficio Centrale di Meteorologia Italiana." "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—MESSINA. OBS. △. LAT. 38° 12′ N., LONG. 15° 33′ E. *Height above M.S.L.*, 114 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 14 TO 28 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January	30·03	—	30·71	29·21	1·50	53	57	48	9	69	33	36	69	6	3·88	15	1·86	—	6	1	0	1	5	3	4	7	4	—	—
February	30·04	—	30·64	29·33	1·31	54	58	49	9	75	33	42	69	6	3·09	13	1·65	—	5	1	0	1	5	3	3	7	3	—	—
March	29·98	—	30·46	29·31	1·15	56	62	51	11	74	36	38	66	6	2·92	13	1·52	—	6	3	0	1	5	3	3	7	3	—	—
April	29·92	—	30·48	29·38	1·10	60	66	55	11	76	46	30	66	5	2·69	11	2·78	—	5	3	0	0	6	4	3	6	3	—	—
May	29·97	—	30·31	29·48	0·83	67	72	60	12	87	49	38	64	4	1·46	7	2·60	—	6	6	0	1	5	3	1	6	3	—	—
June	30·00	—	30·25	29·66	0·59	73	79	67	12	91	54	37	60	3	0·86	5	1·25	—	8	6	1	0	4	3	1	6	1	—	—
July	29·99	—	30·32	29·70	0·62	80	85	73	12	100	63	37	60	2	0·54	3	1·49	—	10	8	0	1	2	1	1	6	2	—	—
August	29·99	—	30·33	29·70	0·63	80	86	74	12	97	63	34	61	2	0·88	3	2·26	—	9	7	0	1	3	1	1	7	2	—	—
September	30·04	—	30·36	29·48	0·88	76	82	70	12	95	60	35	64	4	1·82	7	1·46	—	7	5	0	1	4	3	1	5	4	—	—
October	30·02	—	30·46	29·58	0·88	69	75	64	11	85	48	37	70	5	4·33	13	3·88	—	5	2	0	1	6	5	1	5	6	—	—
November	30·05	—	30·58	29·38	1·20	61	66	57	9	78	44	34	71	6	4·52	13	3·56	—	4	1	0	1	5	5	2	5	7	—	—
December	30·01	—	30·57	29·23	1·34	55	60	51	9	69	35	34	71	7	4·41	17	1·57	—	4	1	0	1	5	4	2	6	8	—	—
Means	30·00	—	—	—	—	65	71	60	11	—	—	—	66	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31·40	120	—	—	75	44	1	10	55	38	23	73	46	—	—
Absolute Values	—	—	30·71	29·21	1·50	—	—	—	—	100	33	67	—	—	—	—	3·88	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	16					28	14			17					25			17										—	—

Authorities :—{ "Annali dell' Ufficio Centrale di Meteorologia Italiana." "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—PALERMO. OBS. △. LAT. 38° 6′ N., LONG. 13° 20′ E. *Height above M.S.L.*, 234 *feet.*

METEOROLOGICAL TABLE COMPILED FROM 16 TO 31 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale, 0 to 10.	RAIN. Total Fall.	No. of Days.	Max. Fall in 24 hours.	WIND. Mean Force. Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January - -	30·00	—	30·66	29·13	1·53	51	60	42	18	82	30	52	73	6	4·03	15	2·28	—	2	3	1	1	2	11	5	3	3	—	—
February - -	30·01	—	30·62	29·29	1·33	52	62	42	20	82	29	53	72	6	3·10	13	2·38	—	2	3	1	1	1	7	6	3	4	—	—
March - - -	29·95	—	30·48	29·22	1·26	55	65	44	21	98	31	67	67	6	2·83	12	1·74	—	2	4	2	1	1	7	7	3	4	—	—
April - - -	29·89	—	30·46	29·33	1·13	58	69	48	21	92	34	58	67	6	2·61	11	1·81	—	1	5	2	1	1	5	6	4	5	—	—
May - - -	29·95	—	30·33	29·38	0·95	65	76	53	23	104	39	65	66	5	1·38	7	1·98	—	1	9	3	1	0	3	5	3	6	—	—
June - - -	29·99	—	30·25	29·62	0·63	71	82	59	23	96	50	46	65	3	0·63	4	1·48	—	1	12	4	0	0	3	3	2	5	—	—
July - - -	29·99	—	30·25	29·70	0·55	76	88	64	24	113	54	59	61	1	0·31	2	0·53	—	1	12	4	0	0	3	3	2	6	—	—
August - - -	29·99	—	30·32	29·66	0·66	76	89	65	24	114	54	60	62	2	0·56	2	1·27	—	2	10	4	0	0	5	3	2	5	—	—
September - -	30·02	—	30·36	29·50	0·86	74	85	63	22	116	51	65	66	4	1·47	6	2·41	—	2	8	3	1	1	5	4	2	4	—	—
October - -	29·99	—	30·45	29·47	0·99	67	78	57	21	105	43	62	69	5	3·98	12	2·56	—	1	5	2	1	1	7	7	3	4	—	—
November - -	30·00	—	30·59	29·35	1·24	59	70	50	20	89	38	51	72	6	3·90	13	3·62	—	1	3	1	1	1	9	8	3	3	—	—
December - -	29·98	—	30·60	29·21	1·39	53	63	44	19	79	30	49	75	6	4·69	16	3·26	—	1	3	1	1	2	9	8	3	3	—	—
Means - - -	29·96	—	—	—	—	63	74	53	21	—	—	—	68	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals - - -	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29·49	113	—	—	17	77	28	9	10	74	65	33	52	—	—
Absolute Values -	—	—	30·66	29·13	1·53	—	—	—	—	116	29	87	—	—	—	—	3·62	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	28	—	19			28	16			19					26		19	—	31									—	—

Authorities :—{ "Annali dell' Ufficio Centrale di Meteorologia Italiana." "Challenger" Report.

Meteorological Office,
October, 1912.

PLACE—CAGLIARI. OBS. △. LAT. 39° 13′ N., LONG. 9° 6′ E. ***Height above M.S.L., 246 feet.***

METEOROLOGICAL TABLE COMPILED FROM 7 TO 18 YEARS' OBSERVATIONS.

MONTH.	BAROMETER Reduced to 32° F., Mean Sea Level, and Lat. 45°. Mean. For Month.	Mean. Daily Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	AIR TEMPERATURE. Mean. For Month.	Mean. Max.	Mean. Min.	Mean. Range.	Absolute. Max.	Absolute. Min.	Absolute. Range.	Relative Humidity.	Cloud Amount. Scale 0 to 10.	RAIN. Total Fall.	RAIN. No. of Days.	RAIN. Max. Fall in 24 hours.	WIND. Mean Force, Beaufort Scale.	Number of Days from N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°	%		Ins.		Ins.												
January -	29·93	—	30·68	29·19	1·49	50	57	45	12	71	28	43	71	5	1·69	9	0·68	—	2	1	2	4	1	1	4	13	3	—	—
February - -	29·99	—	30·53	29·10	1·43	52	59	47	12	69	30	39	71	5	1·35	9	1·38	—	2	1	2	4	2	1	3	10	3	—	—
March - - -	29·90	—	30·48	29·17	1·31	54	61	48	13	77	31	46	69	5	2·14	11	1·41	—	3	1	2	5	2	1	3	10	4	—	—
April - - -	29·84	—	30·29	29·38	0·91	58	66	52	14	78	41	37	64	5	1·63	10	1·04	—	2	1	2	6	2	1	4	10	2	—	—
May - - -	29·91	—	30·30	29·48	0·82	63	73	56	17	87	42	45	61	4	1·03	7	0·86	—	3	1	1	6	3	1	3	10	3	—	—
June - - -	29·95	—	30·15	29·60	0·55	71	79	62	17	93	49	44	58	3	0·91	5	0·59	—	3	0	1	6	5	1	2	9	3	—	—
July - - -	29·95	—	30·30	29·67	0·63	77	86	67	19	99	54	45	53	1	0·08	1	0·18	—	3	0	1	7	4	1	1	10	4	—	—
August - - -	29·94	—	30·26	29·67	0·59	77	86	68	18	99	58	41	56	1	0·22	1	0·83	—	2	0	1	9	4	1	2	10	2	—	—
September - -	29·97	—	30·31	29·57	0·74	73	80	65	15	97	54	43	62	3	1·15	4	1·54	—	2	0	1	8	2	1	2	11	3	—	—
October - -	29·95	—	30·31	29·41	0·90	65	73	58	15	86	45	41	67	4	2·10	8	1·51	—	3	0	2	7	2	1	2	11	3	—	—
November - -	30·02	—	30·44	29·28	1·16	58	65	52	13	77	38	39	70	5	3·97	11	2·92	—	2	1	3	6	2	1	3	10	2	—	—
December - -	29·95	—	30·58	29·17	1·41	52	58	46	12	69	33	36	72	5	2·79	12	3·07	—	3	1	2	4	2	1	4	12	2	—	—
Means - - -	29·94	—	—	—	—	63	70	55	15	—	—	—	65	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals - - -	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19·06	88	—	—	30	7	20	72	31	12	33	126	34	—	—
Absolute Values -	—	—	30·68	29·10	1·58	—	—	—	—	99	28	71	—	—	—	—	3·07	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obsns.	10					7				10					18		10	—	7									—	—

Authority :—"Annali dell' Ufficio Centrale di Meteorologia Italiana."

Meteorological Office,
October, 1912.

APPENDIX IV.

LIST OF SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.

Malta	Lat. 35° 52′ 50″ N. Long. 14° 30′ 41″ E.	Stone pillar 11 inches square on Corrodino height, about 20 yards northward from railing enclosing catchment area and a few yards westward of road from it to door in Naval Ordnance wall. Keys with Naval Ordnance Department. Spire of dome, Musta Cathedral, 291° 55′ true. Flagstaff of Dockyard clock-tower, 70° 55′ true. Spire of dome, Luca Cathedral, 218° 58′ true.
Syracuse (Sicily)	Lat. 37° 2′ 50″ N. Long. 15° 16′ 30″ E.	N. 29° W. (Magnetic), distant 1¼ cables from western corner of Torre Candonini.
Baia degli Aranci (Sardinia).	Lat. 40° 59′ 40″ N. (approx.) Long. 9° 36′ 0″ E. (approx.)	45° true distant 8 cables from Isola Tandy. Punta Pedal, 183° 16′ 55″ true. Monte Sa. Curi, 242° 45′ 35″ true. Signal △ 85° 51′ 15″ true.

APPENDIX V.

GIBRALTAR.

At the Court at *Buckingham Palace*, the 22nd day of March, 1911.

PRESENT,

The KING'S Most Excellent Majesty in Council.

Whereas there was this day read at the Board a Memorial from the Right Honourable the Lords Commissioners of the Admiralty, dated the 15th day of March, 1911, in the words following, viz.:—

"Whereas by Order in Council bearing date the 7th March, 1898, it is provided that a certain water area at Gibraltar shall be placed under the jurisdiction of the Lords Commissioners of the Admiralty, and that powers should be conferred upon them to make Regulations for the proper control of the same:

"And whereas it is desirable that an alteration should be made in the limits of such water area:

"We beg most humbly to recommend that Your Majesty may be graciously pleased to revoke the said Order in Council and to sanction the following proposals:—

"1. All the water area lying between the Admiralty Harbour Works, the North Mole, and the shore, together with the water area extending from the outer edge of low water for a width of 200 yards outside the same from Rosia Mole on the South to the South end of the West Arm of the North Mole—including the Northern Entrance—and for a width of 50 yards outside the faced wall of the North Mole, the boundaries being delineated on the Chart attached to the Order in Council shall be deemed to be Admiralty Waters.

"2. Control over the said Admiralty Waters shall be vested in the Senior Naval Officer at Gibraltar or in such person as may by direction of the said Lords Commissioners be performing the duties of King's Harbour Master.

"3. It shall be lawful for the Senior Naval Officer, or for the person performing the duties of King's Harbour Master, from time to time to make, and, when made, to alter or revoke, such Regulations in writing, as he may deem expedient, in respect of the use, order, and government of the Admiralty Waters, and of all ships and boats therein, including regulations for the exclusion or admission of merchant and other private vessels from and to the Admiralty Waters at Gibraltar, or any part of them.

"4. All such regulations shall be confirmed by the Lords Commissioners of the Admiralty, and shall be published in the London

Gazette and the Gibraltar Official Gazette, and shall be in force as from the last of the two dates at which they are so published. The production of a copy of either Gazette containing such regulations shall be good and sufficient proof for all purposes of the contents thereof, and that the same have been duly made and confirmed in accordance with the terms of this Order.

"5. The masters of all merchant and other private vessels admitted to the Admiralty Waters shall be subject to the directions of the Senior Naval Officer at Gibraltar, or of the person performing the duties of King's Harbour Master, in all matters connected with anchoring, mooring, securing, or shifting berth in those waters.

"6. If the master of any vessel within Admiralty waters does not moor, anchor, place, secure, move, unmoor, or remove the same according to directions given by the Senior Naval Officer at Gibraltar, or by the person performing the duties of King's Harbour Master, in conformity with any Regulations made under this Order, or if there is no person on board of any such vessel to attend to such directions, the Senior Naval Officer, or person performing the duties of King's Harbour Master, may cause the vessel to be moored, anchored, placed, secured, moored, unmoored, or removed, and for that purpose may cast off, loose, or unshackle, and (if need be) sever any chain or rope of the vessel, first putting on board a sufficient number of persons for the protection of the vessel in case there is not a sufficient number of persons on board to protect the same, and all expenses attending the exercise of these powers shall be paid by the owner or person in charge of the vessel.

"7. All merchant and other private vessels permitted to use the Admiralty Waters, shall be subject to the payment of all such general Harbour or Light dues as may from time to time be levied by the Colonial Government of Gibraltar, as if they were anchored, moored, or placed in the Mercantile Port of Gibraltar.

"8. The Senior Naval Officer, or the person performing the duties of King's Harbour Master, may call upon the owner, or person in charge of any wreck, or other thing of any kind whatsoever, being an obstruction in the Admiralty Waters, or in or to the approaches thereto, to remove or destroy such wreck or thing, and the owner or person in charge shall forthwith remove or destroy such wreck or thing, and every fragment of such wreck or thing, which may arise in course of removal or destruction to the satisfaction of the Senior Naval Officer, or of the person performing the duties of King's Harbour Master.

"9. No explosive shall be used for the purpose of destroying any such wreck or thing without the concurrence of the Senior Naval Officer, or the person performing the duties of King's Harbour Master, and in such manner as he may direct.

"10. If the owner or person in charge fails or neglects to remove or destroy such wreck or thing within a reasonable time, to be determined by the Senior Naval Officer, or the person performing the duties of King's Harbour Master; or if, in the opinion of the Senior Naval Officer, or the person performing the duties of King's Harbour Master, the removal of such wreck or thing is a matter of urgency, the Senior Naval Officer, or person performing the duties of King's Harbour Master, may give notice to the owner or person in charge, or to his accredited agent at Gibraltar, that on the expiration of a period to be fixed by and stated in such notice the said Senior Naval Officer, or the person performing the duties of King's Harbour Master, will remove or destroy such wreck or thing, and on the expiration of such period may proceed to do so.

"11. Should any difficulty arise in effecting service of such notice on the owner, or person in charge, or on his accredited agent, such notice may be published in the Gibraltar Official Gazette, and such publication shall be deemed good and valid service thereof.

"12. The expenses incurred by the Senior Naval Officer, or by the person performing the duties of King's Harbour Master, in the removal or destruction of such wreck or thing, and in the temporary lighting, buoying, or marking thereof, shall be repaid by the owner or person in charge thereof, and the Senior Naval Officer or the person performing the duties of King's Harbour Master may detain, and, in case of non-payment of expenses on demand, may sell the wreck or thing, and out of the proceeds of the sale pay those expenses, and the expenses of the sale, rendering the surplus (if any) to the owner or person entitled thereto on demand, and any deficiency may be recovered as a Civil debt from the owner or person in charge. Provided always that no such sale shall (except in the case of property of a perishable nature) be made until at least seven clear days' notice of the intended sale has been given by advertisement in the Gibraltar Official Gazette.

"13. For the purposes of this Order, the owner of a wreck or thing shall be deemed to be the person owning such wreck or thing when such wreck or thing becomes an obstruction, notwithstanding any subsequent sale, transfer, or abandonment.

"14. Any person contravening any rule or regulation contained in or for the time being in force under this Order shall be liable to a *fine* not exceeding £20.

"15. All *fines*, expenses, and sums of money imposed or made recoverable by this Order or by any Regulation under it shall be recoverable in a summary manner subject to the conditions contained in the Justices Ordinance, Gibraltar, 1890, which said Ordinance shall be deemed and taken to be incorporated with this Order for the purposes thereof.

"16. All *fines* recovered under this Order shall be paid into the Colonial Treasury, for the use of His Majesty, His Heirs and Successors.

"Your Majesty's Principal Secretary of State for the Colonies has signified his concurrence in these proposals."

His Majesty, having taken the said Memorial into consideration, was pleased, by and with the advice of His Privy Council, to approve of what is therein proposed. And the Right Honourable the Lords Commissioners of the Admiralty are to give the necessary directions herein accordingly.

Almeric FitzRoy.

Regulations for the Control of the Admiralty Waters at Gibraltar, as defined by the Order in Council of 22nd March, 1911.

The term King's Harbour Master used in these regulations includes any person performing the duties of Harbour Master under the direction of the Senior Naval Officer.

1. No merchant or private vessel shall enter, anchor, moor, or afterwards move, within Admiralty waters without the permission of the Senior Naval Officer; and no vessel having received such permission shall enter without a qualified pilot or other authorised person; but no such permission is required to pass through the northern entrance for the purpose of going to or coming from the Commercial Mole.

2. To prevent chance of collisions with H.M. ships, in either entrance, the following regulaticns will be observed:—

When any of H.M. ships are about to enter or leave Admiralty waters, the following signals will be displayed at the Dockyard Tower, by direction of the Senior Naval Officer, and repeated by the lighthouses at the north end of the South Mole, and at the south end of the North Mole.

By day.—A square red flag.

By night.—A red light and a green light, vertical, 6 feet apart.

When these signals are displayed, no merchant or other private vessel shall attempt to enter, leave, or move within Admiralty waters.

3. Moorings for H.M. ships, mark buoys, or other aids to navigation, and such other buoys as may be required for any purpose in connection with naval or military operation, shall be placed by the King's Harbour Master, as from time to time the requirements of H.M. service may demand.

4. Moorings for private vessels may be laid with the permission, in writing, of the King's Harbour Master, and in such positions as he shall deem fit, but such moorings shall be forthwith removed on the requisition of the King's Harbour Master to that effect.

5. If at any time the anchor of any merchant or private vessel hooks any Government moorings, or any electric cables, or moorings for buoys, the master or other person in charge of such vessel shall not proceed to unhook the same, but shall forthwith give notice thereof to the Senior Naval Officer or King's Harbour Master, in order that aid may be given for clearing such moorings or cables without doing damage to the same.

6. No merchant or other private vessel or boat shall make fast to, or lie at, any of the Government buoys, piles, or mark buoys, without permission from the Senior Naval Officer or King's Harbour Master.

7. No ballast, stones, sand, earth, clay, refuse, ashes, rubbish, dust, sewage, filth of any description, or any other material shall be thrown overboard within that portion of the Admiralty waters enclosed by the breakwaters.

8. The steam syren shall not be used within Admiralty waters except to prevent collision or in case of fog.

9. All merchant or other private vessels within Admiralty waters shall carry out such instructions as they may receive from time to time from the Senior Naval Officer, or other officer acting in his behalf, with respect to putting out fires or lights, or other precautions deemed necessary for the prevention of fire.

10. No fire-arms shall be discharged from any ship or other vessel or boat within Admiralty waters.

11. The master of every merchant or other private vessel, or person in charge of any boat to which these regulations apply, shall observe, and cause to be observed, the regulations as far as they apply to his vessel or boat; and if any master, or other person, acts in any respect in contravention of any of these regulations, or fails to observe or cause to be observed in any respect any of these regulations, he shall be liable to a penalty not exceeding £20.

Note.—The regulations for preventing collisions at sea made from time to time under the Merchant Shipping Act shall apply to all vessels and boats within Admiralty waters.

APPENDIX VI.

MALTA.

Harbour regulations.

Foreign warships and transports.—(1) Unarmed sailors and soldiers from foreign warships and transports may, as a general rule, be landed on shore leave without the necessity of previously obtaining the formal permission of the Governor. It is requested, however, that on occasions when it is desired to land large numbers of men, or bodies in military formation, or unarmed pickets to assist the local police, application may be made beforehand, in order that all possible facilities may be given.

(2) Applications for permission to land armed parties in connection with funerals, or to take part in public ceremonies of an exceptional nature, should also be addressed to the Governor through the usual channel.

Port regulations.

(1) No vessel arriving at these islands from any place beyond seas shall enter any port in these islands other than the Great Harbour of Valletta or the Quarantine Harbour.

If any such vessel shall enter any such other port, the master shall forfeit a sum of money not greater than £50 and not less than £2.

(2) No master of a merchant vessel shall moor his vessel between the mouth of the Great Harbour and the point of Senglea, or keep the said vessel at anchor there for a time longer than necessary to approach the Marina or some mole, or to depart from thence: or moor the said vessel in the places where the passage boats usually disembark their passengers, or otherwise obstruct the passage of such boats.

(3) No steamer shall be allowed to drop or weigh anchor without a pilot in the area within two lines, the one drawn from Calcara gate landing place to Isola point, and the other from the police station outside advanced right Marina gate to Ras Hanzir.

(4) No master of a merchant vessel shall make fast any chain or rope to any of the buoys laid down for the use of His Majesty's Navy; or careen his vessel except in one of the places established for that purpose by the Collector of Customs; or melt pitch, tar, resin, or other inflammable substance on the moles, or in a boat, or in close

proximity to any vessel, or in places not selected for that purpose by the said Collector of Customs.

(5) The master of mail and other steamers having passengers on board shall, with the least possible delay, cause all available accommodation ladders to be lowered on both sides of the vessel.

(6) No master of a merchant vessel shall fasten his vessel anywhere but to the bollards or rings intended for that purpose; or fasten with chains the vessel to the said bollards without using a mat or such other means as, in the opinion of the said Collector of Customs, may be sufficient to prevent the chain from damaging the wharf.

All merchant vessels lying at anchor shall have their anchors and chains so as not to come in contact with the anchor and chains of other vessels, when in boisterous weather they loosen their hawsers from the land.

Every vessel, anchored or moored in any part of the harbour, shall keep her jib-boom and flying jib-boom thoroughly rigged in.

Every master or owner of a merchant vessel shall during the night keep a guard on board of the said vessel; and shall keep any boat belonging to the said vessel moored and without oars.

(7) No master shall permit any boat to approach his vessel, except pilot boats and steam tugs seeking hire, before the officer, charged with such duty by the said Collector of Customs shall have visited the vessel; or any person to disembark before the vessel shall have received pratique.

(8) Every master of a merchant vessel shall prevent any smoking or any fire being kept alight on board, whilst in the act of loading or unloading hemp, esparto grass, or other merchandise of an inflammable nature, until the hatches shall have been secured.

(9) Every master of a merchant vessel shall declare to the said Collector of Customs the quantity of gunpowder which he may have on board, and shall not approach the mole to unload any merchandise before having deposited such gunpowder in the place pointed out by the said Collector of Customs; and in case he has more than three barrels of gunpowder, he shall, on entering the port, extinguish all fires, except steaming fires, and shall anchor the vessel in the place which shall be pointed out by the said Collector of Customs. He shall keep a red flag at the mainmast head until such powder shall have been deposited, and previously to commencing to deposit the same he shall expressly warn the vessels lying near.

(10) It is prohibited to throw into the ports anything which might cause deposits of mud; or in any other way alter the bottom of the port or obstruct the mouths of the public sewers which discharge into the sea; or to leave in the ports or on the moles any merchandise or

other rotten or unwholesome thing which might be prejudicial to the public health or give rise to a nuisance.

(11) It is prohibited to the owner, consignee, agent, master, or other person in charge of any vessel arriving in Malta from any place out of these islands, to land, or permit to land, without the permission in writing of the Collector of Customs, any person who has secreted himself and arrived in such vessel.

(12) The use of the steam whistle, fog horn, or siren, is confined to vessels under way, for the purpose of safe navigation. Vessels lying at anchor or moored in the harbours are not to use the steam whistle, fog horn, or siren, for any purpose whatever.

(13) Every master of a merchant vessel must exactly follow any instructions which the superintendent of the ports may give in regard to the place where his vessel is to lie, and in regard to the position of the said vessel.

(14) Commanders or masters of vessels are hereby warned that, owing to the large number of small craft plying in the harbour at all hours, strict attention should be paid to moorings to prevent their being tampered with.

In the event of any suspicious circumstances, such as boats without lights approaching during the night, the police should be at once communicated with, a message being sent to the Custom-house, if necessary.

(15) No goods shall be discharged on Sundays or public holidays or on other days except between the hours of 6 a.m. and 6 p.m. from 1st April to 30th September inclusive; and between 7 a.m. and 5 p.m. from 1st October to 31st March inclusive, unless by special permission of the Collector of Customs.

Tariff of fares to be paid for pilot boats.

	£	s.	d.
(1) If engaged for the use of vessels of 100 tons or less	0	8	0
From 101 to 150	0	12	6
From 151 to 250	0	16	0
From 251 to 350	1	0	0
From 351 and upwards	1	5	0

(2) When the pilot boat shall be employed for vessels on their departure, or on removal of a vessel from one part of a harbour to another part of the same harbour, one-half of the above fares shall be paid.

(3) For the passing from one harbour to the other two-thirds of the above fares shall be paid.

(4) Besides the above fares, there shall be paid to the pilots employed on board a vessel in quarantine, 1s. 8d. a day, together with their food, or 2s. 8d. a day without food.

(5) Vessels requiring the pilots to lay out an anchor in the pilot's own boat shall pay a sum of 5s. in addition to the above fares.

(6) Vessels that do not take a pilot, but acquire the services of a boat for securing hawsers or other work connected with mooring the vessel, shall pay a sum of 6s.

(7) Pilots are absolutely precluded from making any private arrangements with masters of vessels or agents, and from receiving any pecuniary or other remuneration in excess of that established in the tariff. Should it, however, under very extraordinary circumstances, be considered desirable to offer a gratuity to any member of the pilot service, such gratuity may be received by special permission of the Collector of Customs.

(8) Any complaints against pilots should be made in writing and addressed to the Collector of Customs.

APPENDIX VII.

Admission of foreign war vessels to French territorial waters and ports in time of peace.

(*Decree of 21st May, 1913.*)

1. The term "war vessel" is herein considered to apply to all vessels designated as such in the accepted meaning of this term, as well as to auxiliary vessels of every description.

2. For the purposes of the present regulations:—

(*a*) The French littoral is divided into sections, the limits of which are as follows:

Channel section.—From the Belgian frontier to Primel point.

Atlantic section.—From Primel point to the Spanish frontier.

Mediterranean section.—From the Spanish frontier to the Italian frontier (including Corsica).

(*b*) Tunisia, Algeria, and the Moroccan protectorate form a single section.

3. In peace time foreign war vessels are permanently authorised to visit French ports and those of protectorates, and to anchor in territorial waters, on condition that the number of such vessels flying the same flag does not exceed three per section.

In considering the number of vessels which can be admitted into a section at the same time, vessels already in that section will be taken into account.

The notification of a projected visit should, however, always be transmitted through the usual diplomatic channel so as to arrive, if circumstances permit, at least seven days before the date of the projected visit.

Foreign war vessels may not stay more than 15 days in ports and territorial waters. They will be required to put to sea in six hours if requested to do so by the naval authorities or by the "Commandant d'Armes," even if the prescribed term of stay has not expired.

4. A special authorisation from the Government of the Republic, obtained through the usual diplomatic channel, is necessary both in order to prolong the duration of the visit and to exceed the number of vessels admitted specified in article 3.

5. The regulations given in articles 3 and 4 do not apply:—

(*a*) To ships of war and vessels on board of which are embarked Heads of States, members of reigning dynasties or their suites, or diplomatic representatives accredited to the Government of the Republic.

(*b*) To war vessels compelled to put into port by reason of damage sustained, bad weather or other unforeseen causes.

(*c*) To vessels engaged in the superintendence of fisheries, in accordance with the conventions relating to these fisheries.

6. In ports which are chief naval ports of arrondissements or the head-quarters of a senior naval officer, the right of assigning anchorage berths to foreign war vessels or of directing them to shift berth, if necessary, is vested solely in the Prefect Maritime or senior naval officer (Commandant de la Marine).

At all ports this right is vested in the Captain of the port.

7. Upon entering a port, foreign war vessels will be boarded by a naval officer, sent by the Prefet Maritime or senior naval officer, or by a port official sent by the Captain of the port, who will offer the commanding officer the courtesy of the port.

The officer will acquaint the commanding officer with the anchoring berth that has been allotted to his ship, and will obtain information as to the object and proposed duration of the visit, the name of the commanding officer, and the information it is usual to obtain upon such occasions.

Should the officer sent to welcome the foreign war vessel arrive on board after she has already anchored or made fast, the prescribed communication and enquiry will nevertheless be made and the confirmation of the anchoring berth taken or the assignation of another will also be carried out.

At anchorages where there is no Captain of the port, if no French war vessel is present, the foreign war vessel will be boarded by a Customs official.

8. Foreign war vessels calling at a port or in territorial waters are required to respect the fiscal laws and the laws and regulations regarding sanitation:

They are also required to adhere to all port regulations to which vessels of the French Navy are subject.

With this object, the local naval authority will furnish the commanding officer with all necessary information concerning the port regulations.

Foreign war vessels within territorial waters are forbidden to take bearings of the land or soundings, or to carry out, without permission, landing or firing exercises.

No submarine work, executed with or without divers, is to be undertaken without previous notice to the naval authorities.

Men belonging to ships' companies and troops must be unarmed when landed. Officers nad petty officers (or N.C.O.'s) may carry the side arms which form part of their uniform.

The number of liberty men to be landed, the time of landing and return on board, will be fixed by arrangement with the local civil authorities and the Commandant d'Armes.

Boats moving in ports and territorial waters may not be armed.

The death sentence may not be carried out by any foreign war vessel in territorial waters.

If a funeral is to take place on shore and the commanding officer desires an armed party to accompany the procession, he must obtain the permission of the Commandant d'Armes.

9. The regulations for the admission of belligerent foreign war vessels are set forth in the decree of the 18th October, 1912, but remain subject to the formalities of notification or previous authorisation specified in articles 3 and 4 of the present decree, except in cases of force majeure provided for in paragraph (*b*) of article 5.

10. Should a foreign war vessel fail to comply with the regulations set forth in this decree, the local naval or military authority will first call the attention of her commanding officer to the infringement committed and formally request him to observe the regulations.

Should this course fail, the qualified authority, Prefet Maritime, Senior Naval Officer, or Commandant d'Armes, may request the foreign war vessel to leave the port or territorial waters immediately.

Regulations for approaching French territorial waters in time of war.

(*Decree dated 26th May, 1913, modifying decree of 19th July, 1909.*)

1. In time of war, the visits of ships, other than French war vessels, to anchorages and ports on the French littoral or in French protectorates, are governed by the regulations given below.

2. No French merchant vessel, nor foreign vessel, either war or merchant, may approach within 3 miles of the coast in French territorial waters or of French protectorates without permission without running the risk of being destroyed.

3. Between sunrise and sunset, every vessel affected by the present decree is to fly her national flag and number by International code (if she has one) as soon as she approaches the forbidden zone. If desirous of entering the latter, a request is made by hoisting the pilot signal, the ship remaining outside the zone until authorised to enter by semaphore, the signal station or examination vessel.

The reply from a semaphore, or signal station, is made in the International code by the following signs:—

S. flag.—Entry permitted.

D. pendant.—Entry deferred.

Q. flag.—Entry forbidden.

If permission to enter is given, a ship is to steam at reduced speed in the forbidden zone, keeping the signal for a pilot flying.

If entry is deferred, a ship is to manœuvre so as to clear the entrance to the channels and await the examination vessel, steaming towards the latter at reduced speed when seen.

If entry is forbidden a ship is to abandon the idea of entering and make for another anchorage.

The examination vessel is distinguished by three balls on the same halyard.

4. Between sunset and sunrise, every vessel affected by the present decree, is to fly her national flag and have navigation lights lit on approaching the forbidden zone. If desirous of entering the latter, a request is made by burning one or more bengal lights and blowing blasts on the whistle or siren, the ship remaining outside the zone until permission to enter has been granted by an examination vessel.

The ship, with her navigation lights showing, will await the examination vessel, and continue to burn bengal lights to attract attention, and if not warned, on sighting the examination vessel, may steam towards her at reduced speed.

The examination vessel is distinguished by three *red* lights superimposed.

A *red* Coston light exhibited from a station on shore signifies that entry is forbidden; a ship must then give up the idea of entering, and make for another anchorage.

Between sunset and sunrise, every vessel affected by the present decree is in principle forbidden to request entry into the zones off the naval bases of operations—Cherbourg, Brest, Toulon, Bizerta—the only cases in which captains can request permission to enter are the following:—

Vessels authorised to do so by the Governor, either on their departure or whilst *en route*.

Vessels in danger, and absolutely incapable of remaining at sea until daybreak, or of reaching another anchorage.

5. In foggy weather every vessel affected by the present decree desirous of entering the forbidden zone, is to hoist the same signals as in clear weather and blow blasts on the whistle or siren until permission to enter has been given by an examination vessel.

Entry into the naval bases of operations—Cherbourg, Brest, Toulon, Bizerta—is forbidden in foggy weather under the conditions specified in article 4.

6. Every vessel affected by the present decree must immediately comply with the orders of a war vessel or examination vessel, semaphore or signal station, given by voice, international signal code, or by warning gun.

Every ship warned by a battery or war vessel, whatever her distance from shore may be, is to immediately stop. When stopped, a ship may renew her request to enter, but must await where she is orders which will be notified.

If in spite of the warning given by the firing of a blank charge, a ship does not stop at once, a premonitory shot will be fired two minutes

later, and if after the expiration of a further two minutes' interval, the vessel is still under weigh, effective fire will be opened upon her.

In cases of emergency the blank charge may be omitted.

At night the warning gun may also be omitted, and every ship entering the forbidden zone without permission is liable to be destroyed without preliminary warning.

7. Vessels authorised to enter the roadsteads and ports of France and her protectorates are to take up the berths indicated by the local authority, and conform strictly to the regulations of every nature issued by that authority.

The length of stay of a ship will depend on military considerations, and when circumstances require it a ship may be ordered to put to sea or to move to a determined point; such order must be carried out without delay, though respite may be allowed to ships really unable to conform to it immediately.

No vessel is to get under weigh, either to change berth or to quit the roads, without the permission of the local authority; a request may be made by signal, S. flag.

8. In naval roads and ports, between sunset and sunrise, the movement of boats, other than those of war vessels, is absolutely forbidden.

From sunrise to sunset, movement is only allowed to boats which have received a special permit from the naval authorities and the means of making themselves recognisable.

Boats with permits should steer clear of war vessels if ordered to do so, and cannot in any case go alongside the latter without their permission. The movement of these boats will moreover remain subject to local regulations, notably those relative to the prohibition to enter certain parts of the roadstead, and to go alongside at any other place than those expressly notified.

In commercial ports similar measures will be taken by the local authority to impose the restrictions judged necessary on the movement of boats, due consideration being given to the interests of commerce.

9. Visits by neutral war vessels are governed by the decree of 21st May, 1913, so far as notification or previous authorisation is concerned, the regulations for entry being governed by the present decree.

10. The measures provided for by the present decree are to come into force on mobilisation or on special notice.

11. Any infraction of the present decree will lead to such repressive measures as circumstances admit of, in addition to the risks of destruction incurred.

12. Regulations contrary to the present decree are cancelled.

13. The Minister of Marine is charged with the execution of the present decree.

Signed by the PRESIDENT on

26th May, 1913.

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